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# MS-7398

Version 1.0

## CPU:

Intel Prescott ( L2=2MB ) - 3.4G & Above  
 Intel Cendar Mill (65nm) - 3.73G & Above  
 Intel Smithfield (90nm Dual core)  
 Intel Conroe (65W Dual core)

## System Chipset:

Intel Lakeport - MCH (North Bridge)  
 Intel ICH7R (South Bridge)

## On Board Chipset:

BIOS -- FWH EEPROM  
 HD -- ALC888  
 LPC Super I/O -- F71882FG  
 LAN-- REALTEK RTL8111/C Co-lay RTL8101E  
 CLOCK -- RTM 876-665

## Main Memory:

DDR II \*4 (Max 2GB)

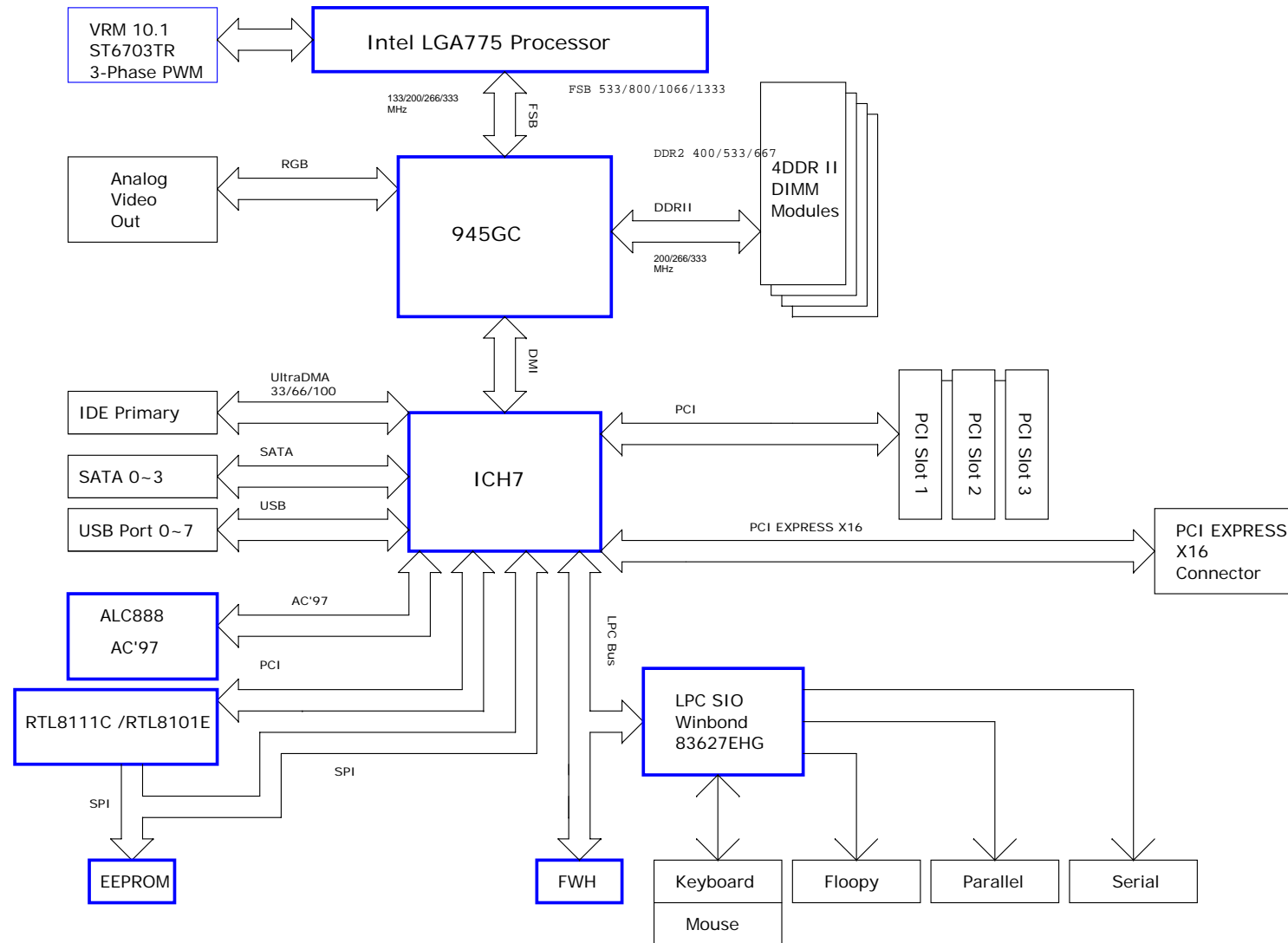
## Expansion Slots:

PCI2.3 SLOT \* 3  
 PCI EXPRESS X16 SLOT

## RICH PWM:

VRM ST L6703TR  
 Controller: 3 PHASES

# Block Diagram

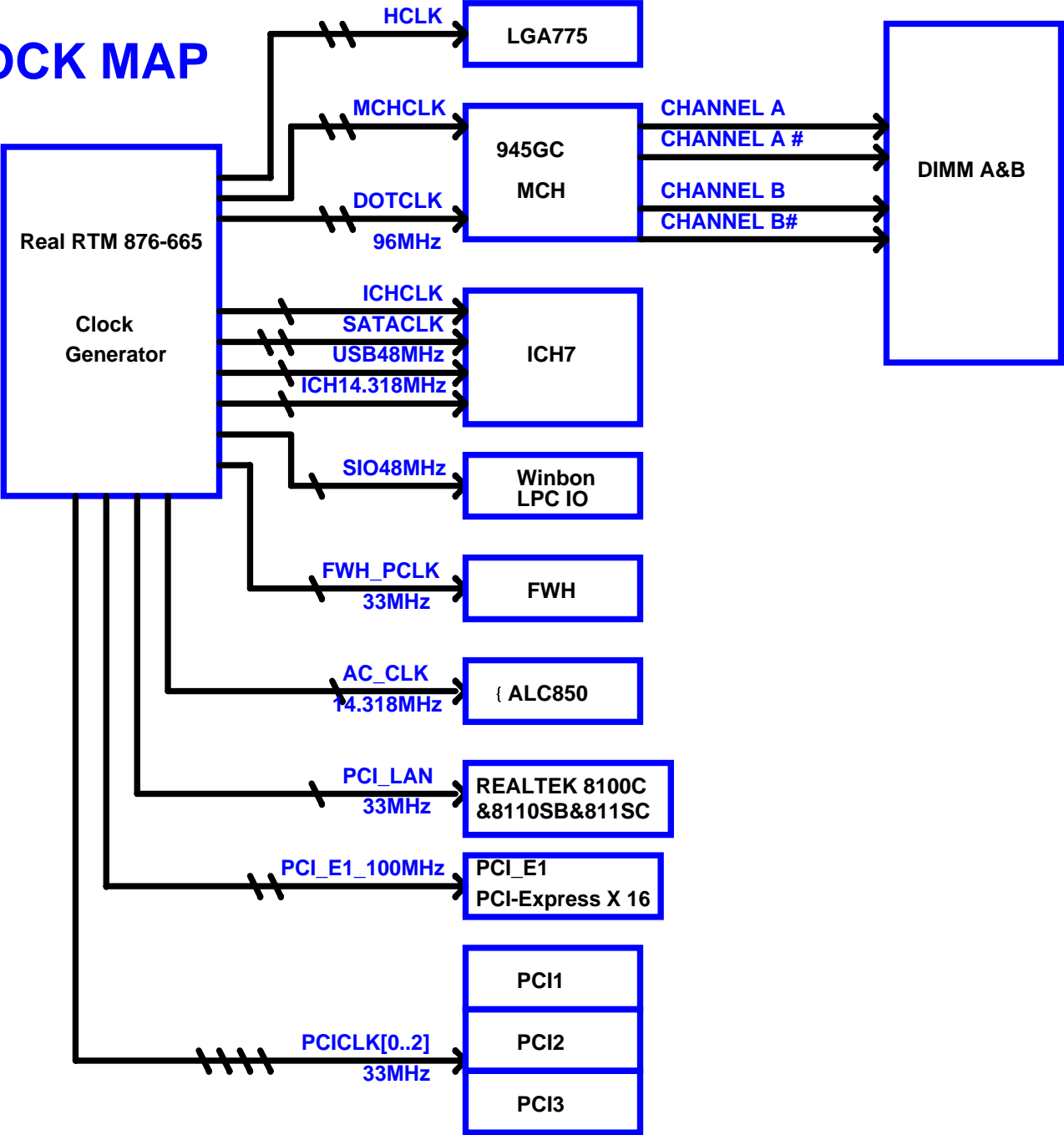


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**MS-7398**

Size Custom	Document Description <b>BLOCK DIAGRAM</b>	Rev 1.0
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# CLOCK MAP

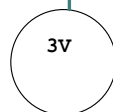


<b>INTEL 775</b>		
0.8375V - 1.6000V Core	-	125A
1.2V FSB Vtt	-	5.3+0.8=6.1A

<b>NB-945GC</b>		
+1.3V REGULATOR	-	8.81 A
+1.3VDUAL REGULATOR	-	25 mA
+1.8V REGULATOR	-	2.4 A
+3.3V REGULATOR	-	621 mA
+3.3V DUAL	-	163mA
RTC (G3)	-	3 mA

<b>Audio</b>		
3.3V AUDIO	-	40mA
5V AUDIO	-	200mA

<b>SPI</b>		
+3.3V (S0,S1)	-	30mA



<b>ISL6322</b>		
VCCP	VRM 11	
0.8375V-1.6000V	125A	
4-Phase Switch		

<b>W83310DS</b>		
VTT_DDR		
0.9V	Linear	1.2A

<b>Regulator</b>		
V_FSB_VTT		
5.3A+0.85A=	6.1A	
VCC1_3		
1.35V	Linear	8.81A
5VUSB_REAR/FRONT		
5V	Linear	2A / 3A
5VSB	400mA / 600mA	
5VDIMM		
5V		9.34A
5VSB		225mA

<b>uP7706 Regulator</b>		
3VDUAL		
3.3V		1.7A

<b>uP7707 Regulator</b>		
1_3VDUAL		
1.35V		25mA

<b>uP6103 Regulator</b>		
VCC_DDR		
1.8V	Switch	22.21A (S3)

5VAudio	+5VR	800mA
---------	------	-------

+12V	
<b>ATX 2x2</b>	

+12V	+5V	+3.3V	+5VSB
<b>ATX POWER</b>			

<b>DDR DIMM &amp; TERMINATOR</b>		
0.9V VTT_DDR	-	1.2A
1.8V VCC_DDR (S0,S1)	-	9.4A
1.8V VCC_DDR (S3)	-	400mA

<b>PCI Express x16 slot (X1)</b>		
+12V	-	5.5 A
+3.3Vaux (wake)	-	375mA
+3.3Vaux (no wake)	-	20mA
+3.3V	-	3.0A

<b>PCI Express x1 slot (X1)</b>		
+12V	-	0.5 A
+3.3Vaux (wake)	-	375mA
+3.3Vaux (no wake)	-	20mA
+3.3V	-	3.0A

<b>PCI slot x2</b>		
+3.3Vaux (wake)	-	750mA
+3.3Vaux (no wake)	-	40mA
+3.3V	-	15.2A
+5V	-	10A
+12V	-	1.0A

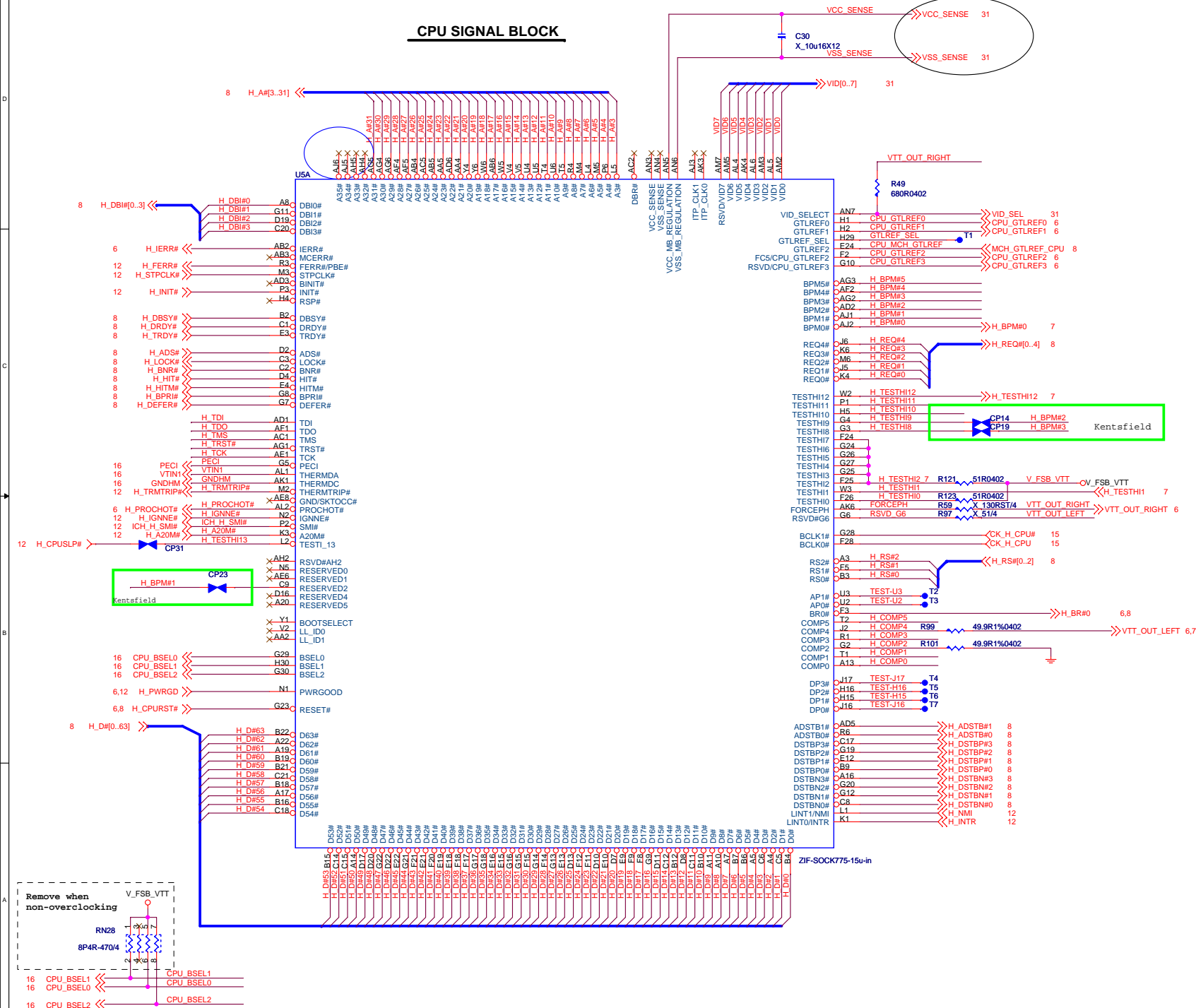
<b>USB</b>		
+5V (S0,S1)	-	5.0A
+5V (S3)	-	25mA

<b>PS2</b>		
+5V (S0,S1)	-	345mA
+5V (S3)	-	2.0mA

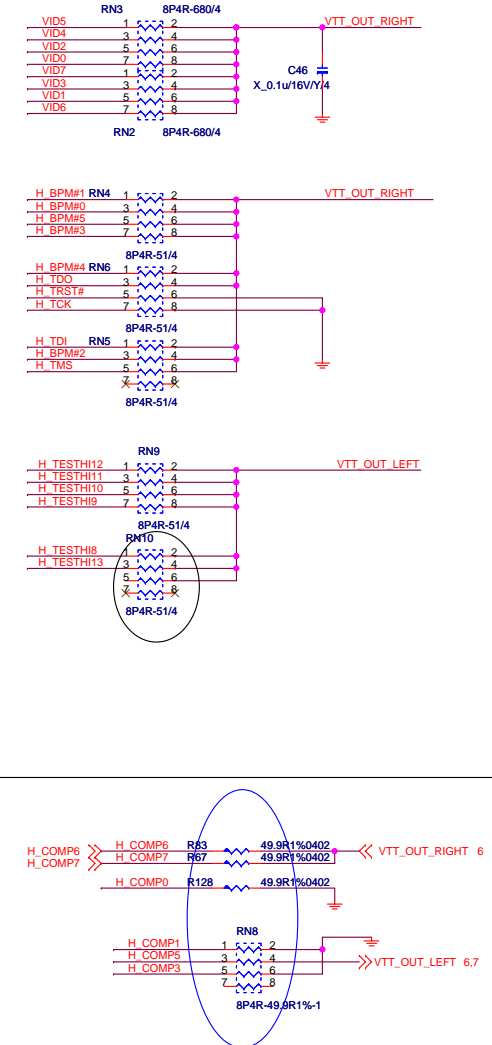


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<b>MS-7398</b>			
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<b>POWER MAP</b>			
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### CPU SIGNAL BLOCK



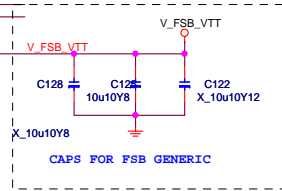
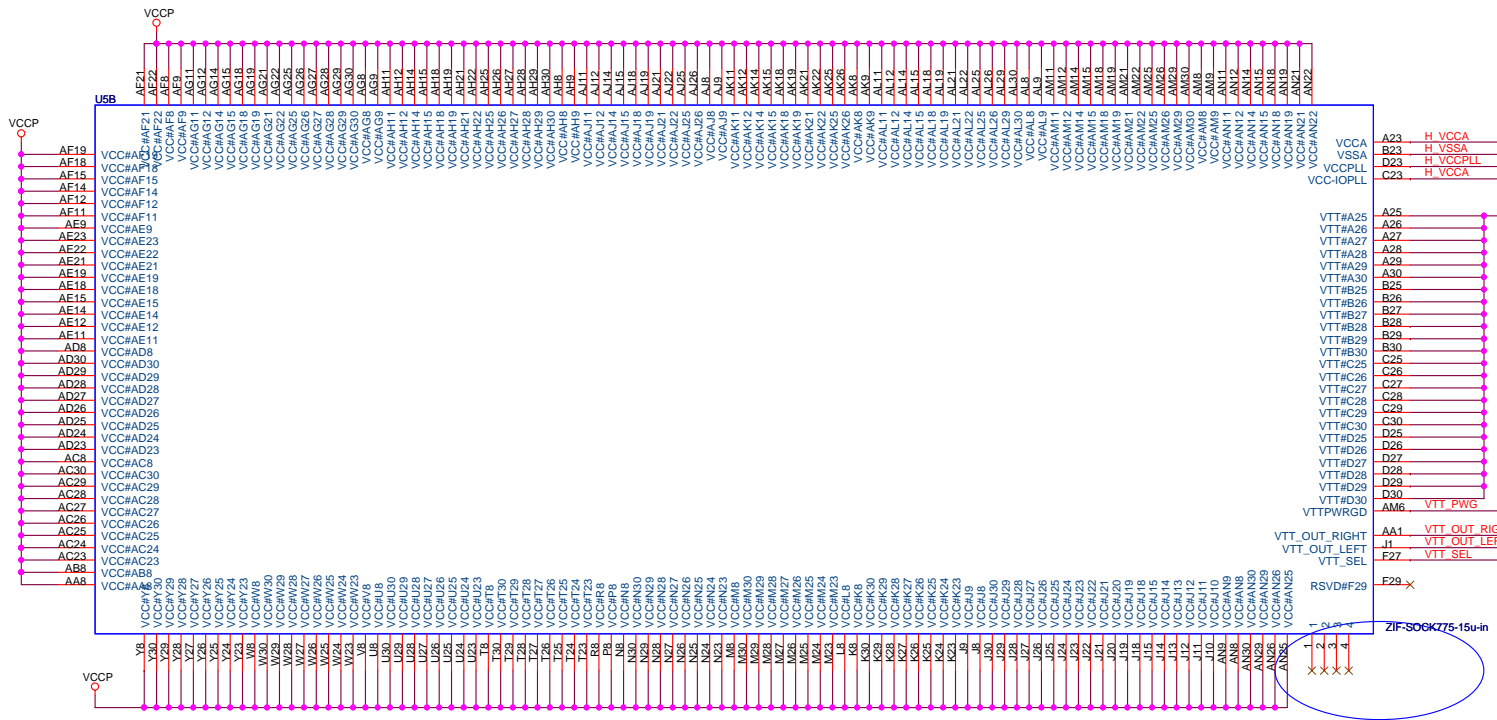
### PULL HIGHT PULL DOWN



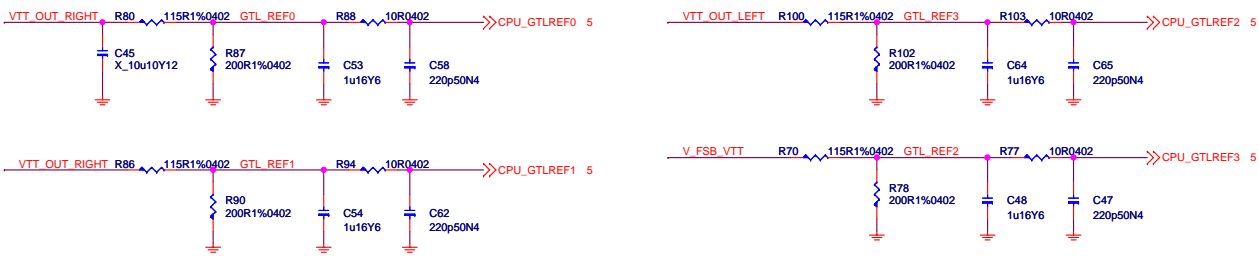
**MICRO-STAR INT'L CO.,LTD**

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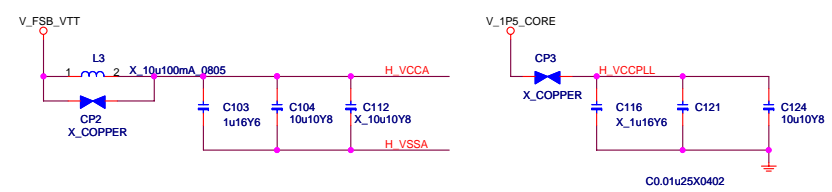
Size Custom	Document Description <b>LGA775 - Signal</b>	Rev 1.0
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\*GTLREF VOLTAGE SHOULD BE  
0.67 \* VTT = 0.8V (At VTT=1.2V)

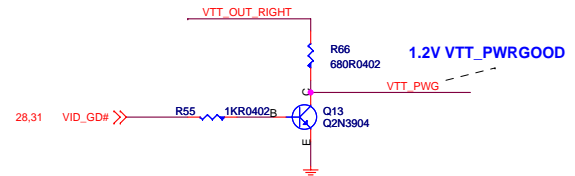
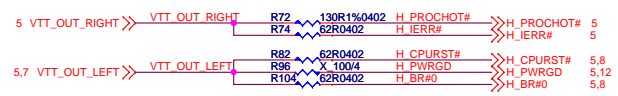


\*PLACE COMPONENTS AS CLOSE AS POSSIBLE TO PROCESSOR SOCKET  
\*TRACE WIDTH TO CAPS MUST BE NO SMALLER THAN 12MILS



## VTT PWRGOOD

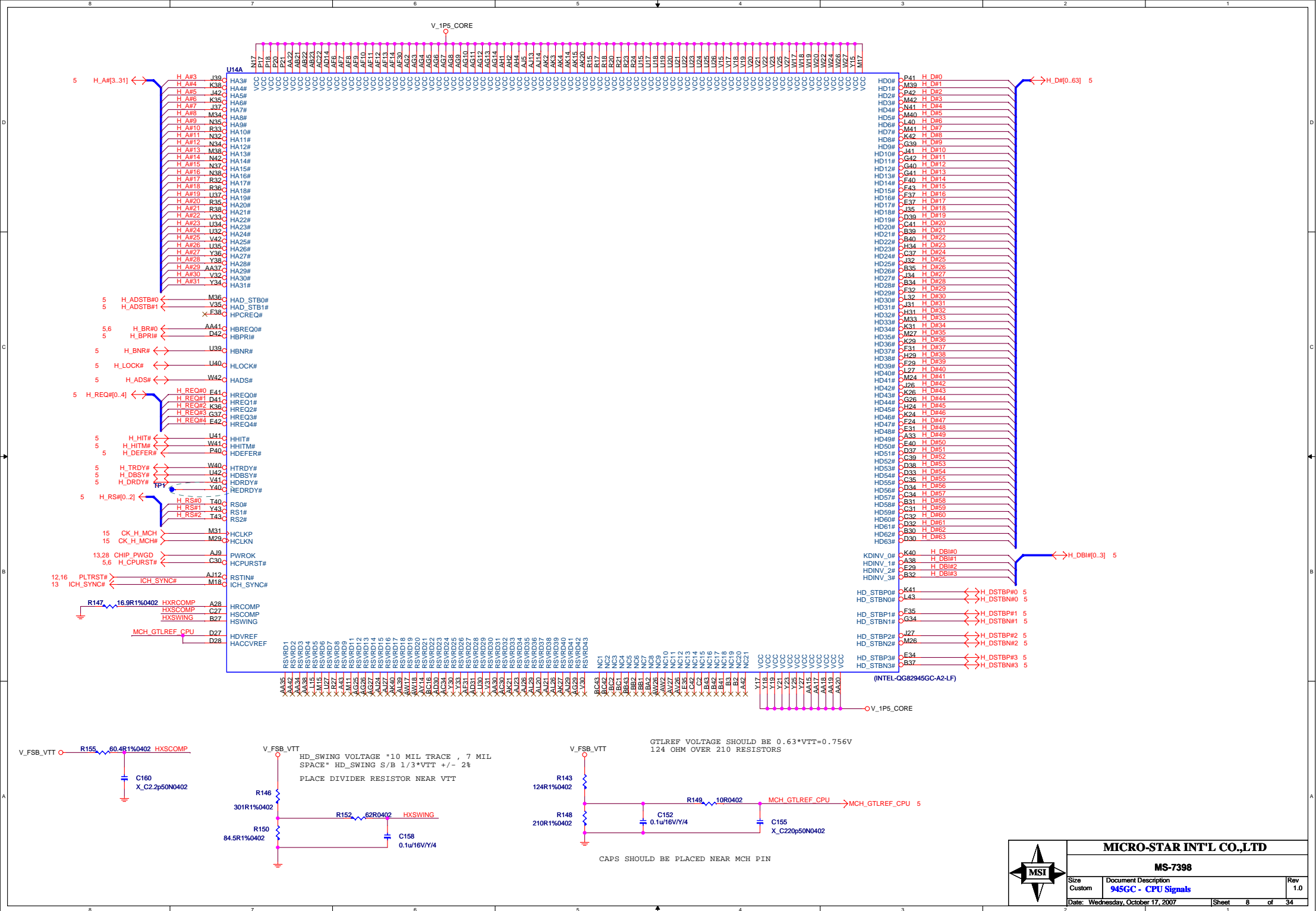
PLACE AT CPU END OF ROUTE



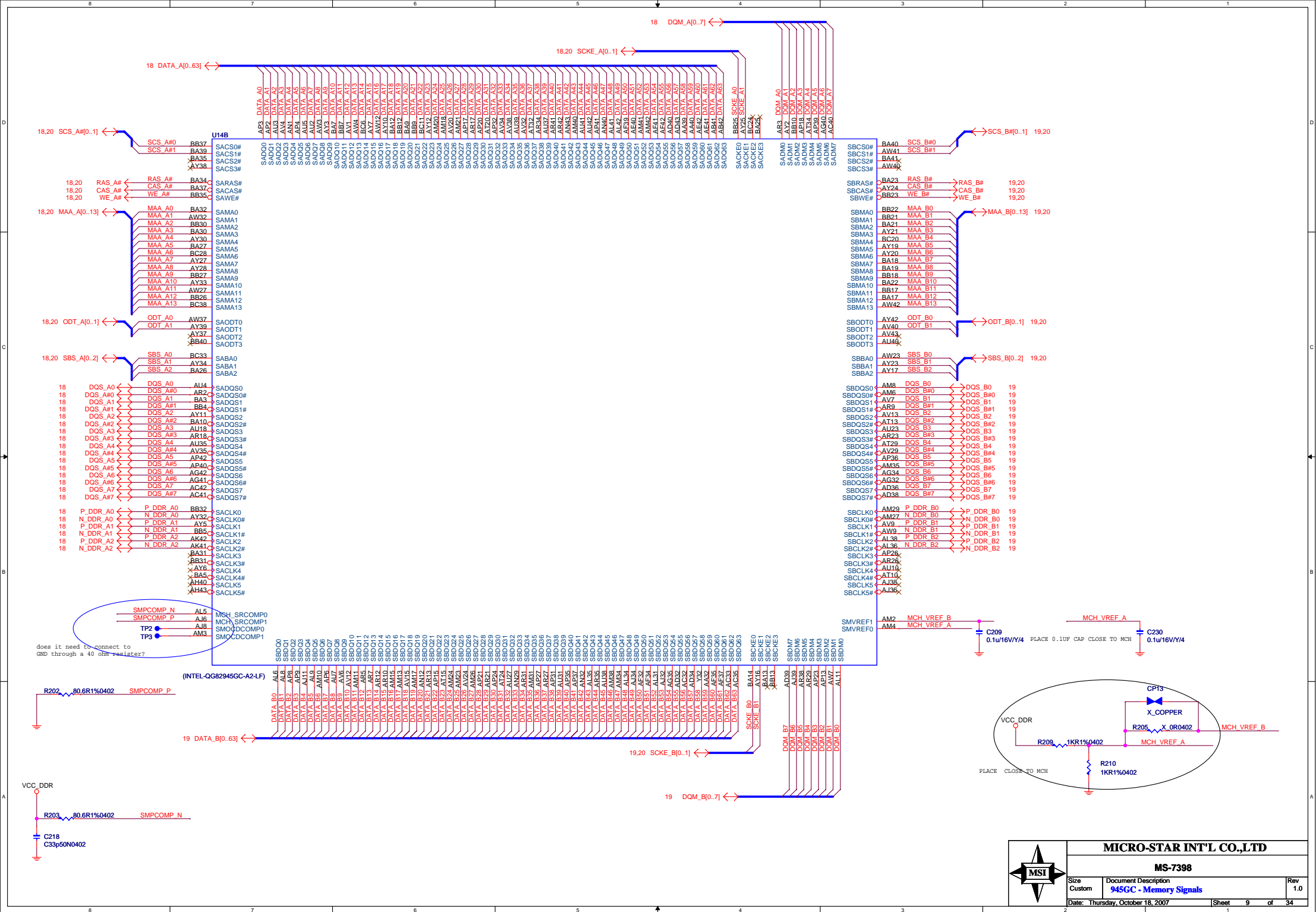
VTT\_PWG SPEC :  
High > 0.9V  
Low < 0.3V  
Trise < 150ns

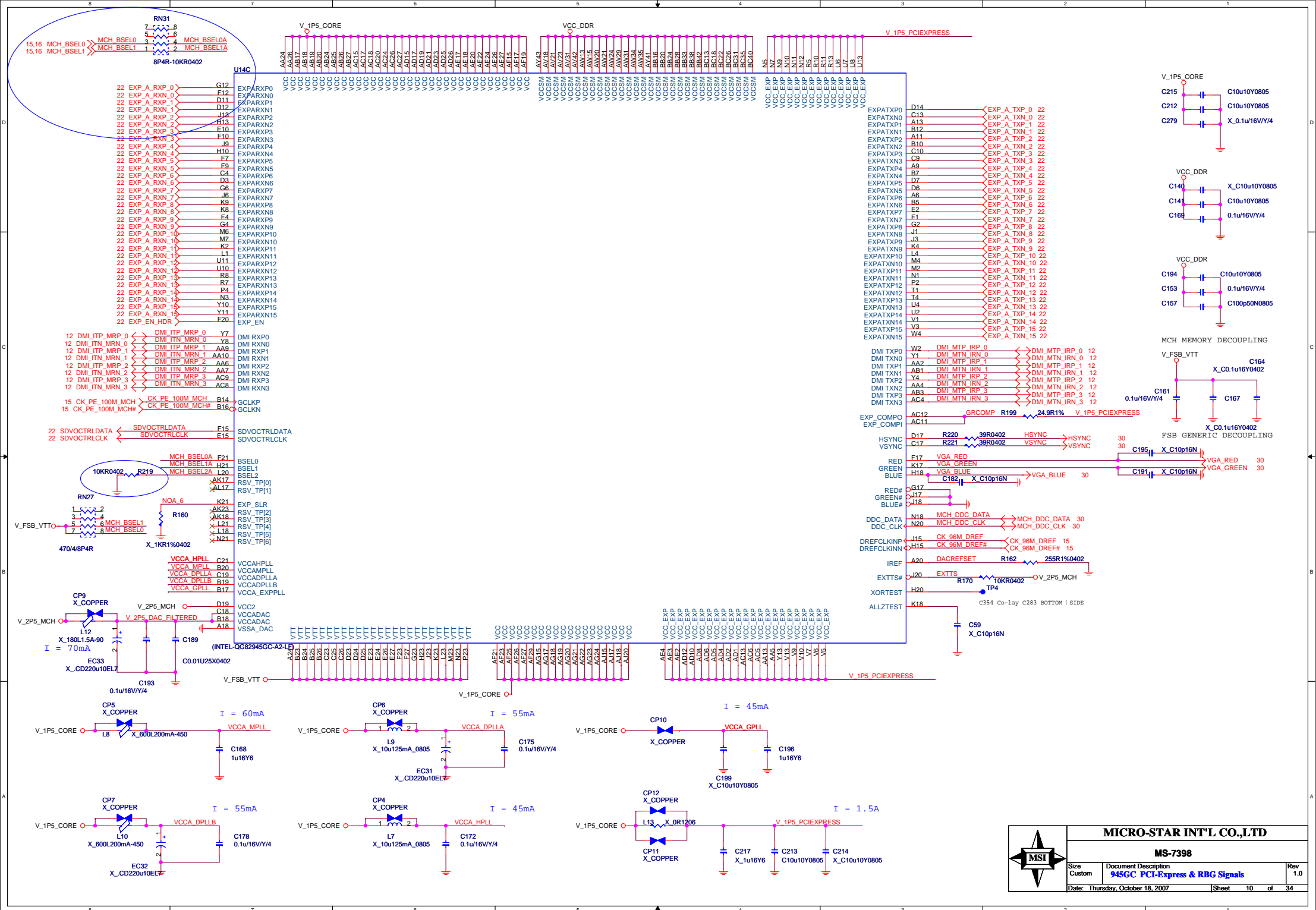
			<b>MICRO-STAR INT'L CO.,LTD</b>	
			<b>MS-7398</b>	
Size Custom	Document Description <b>LGA775 - Power</b>	Rev 1.0		
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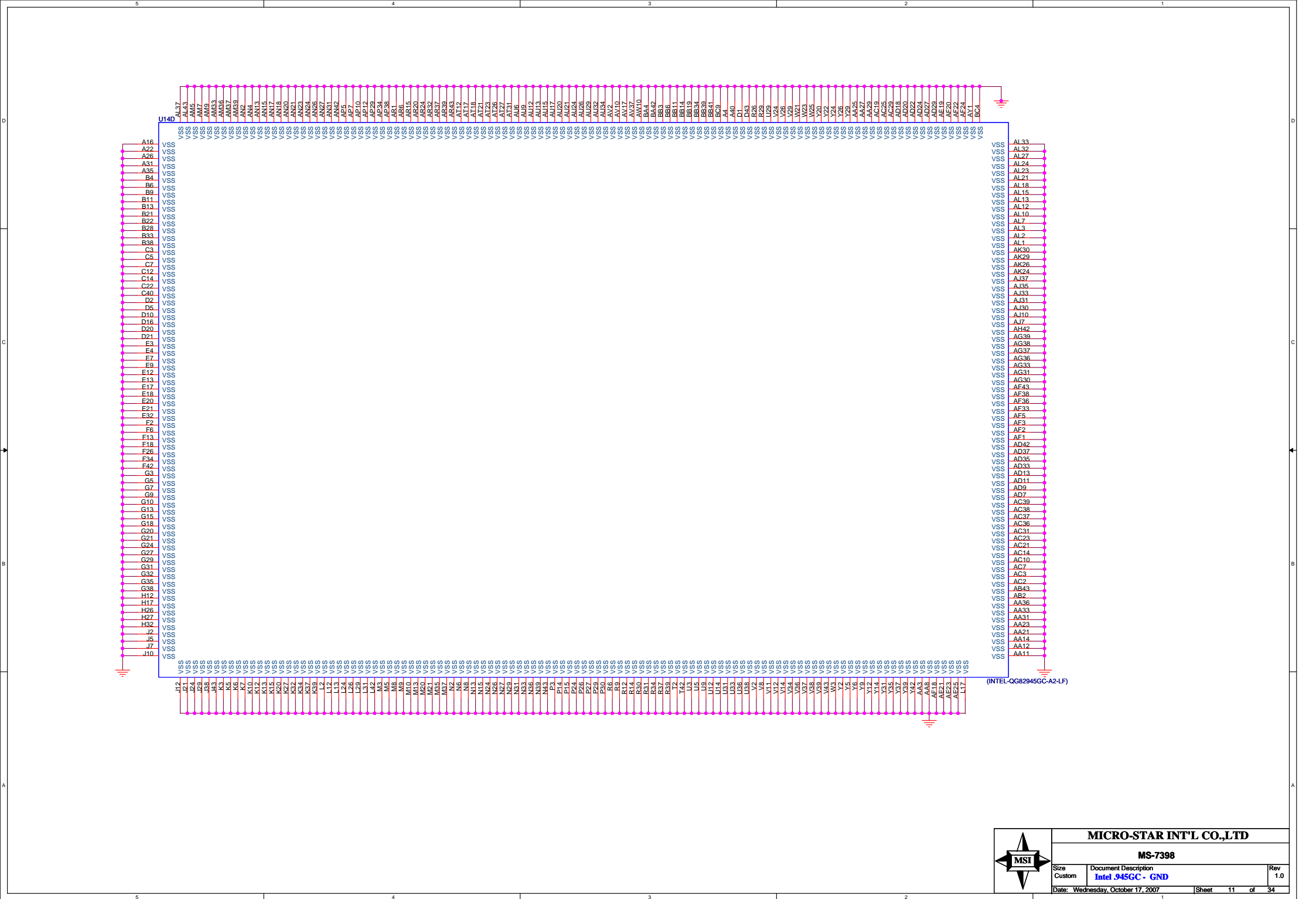












ICH 7  
PART 1/3

PCI INTERFACE

CPU

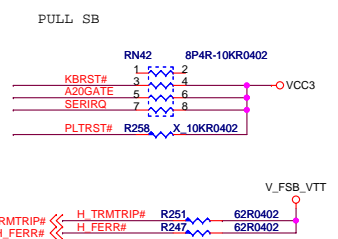
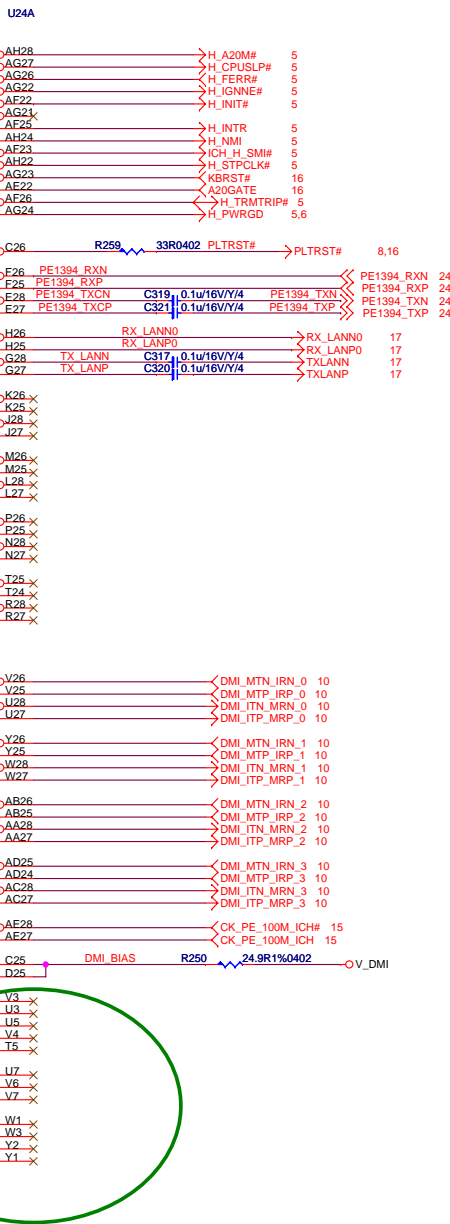
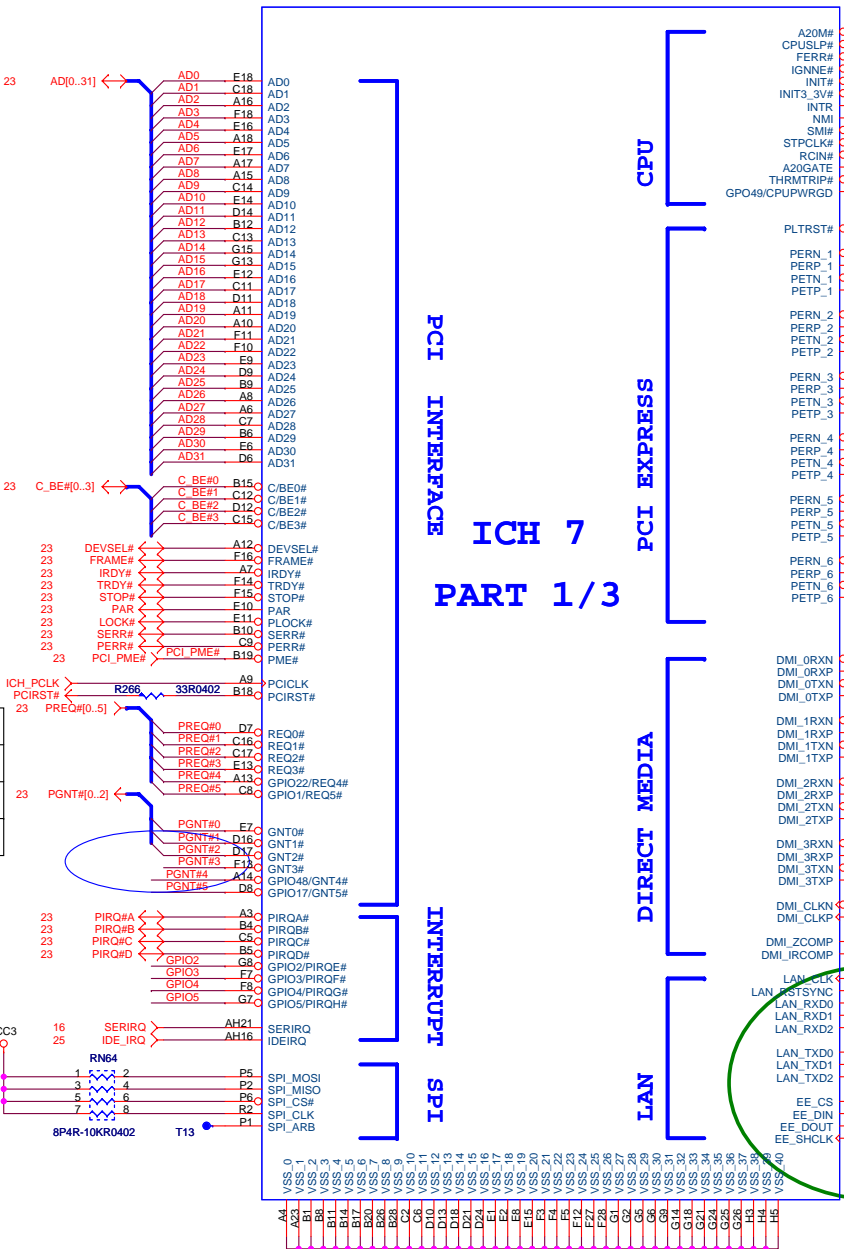
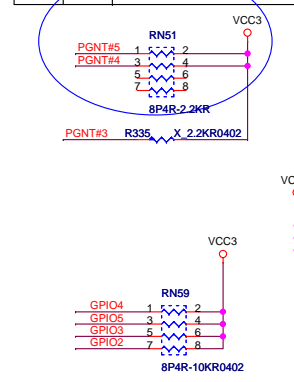
PCI EXPRESS

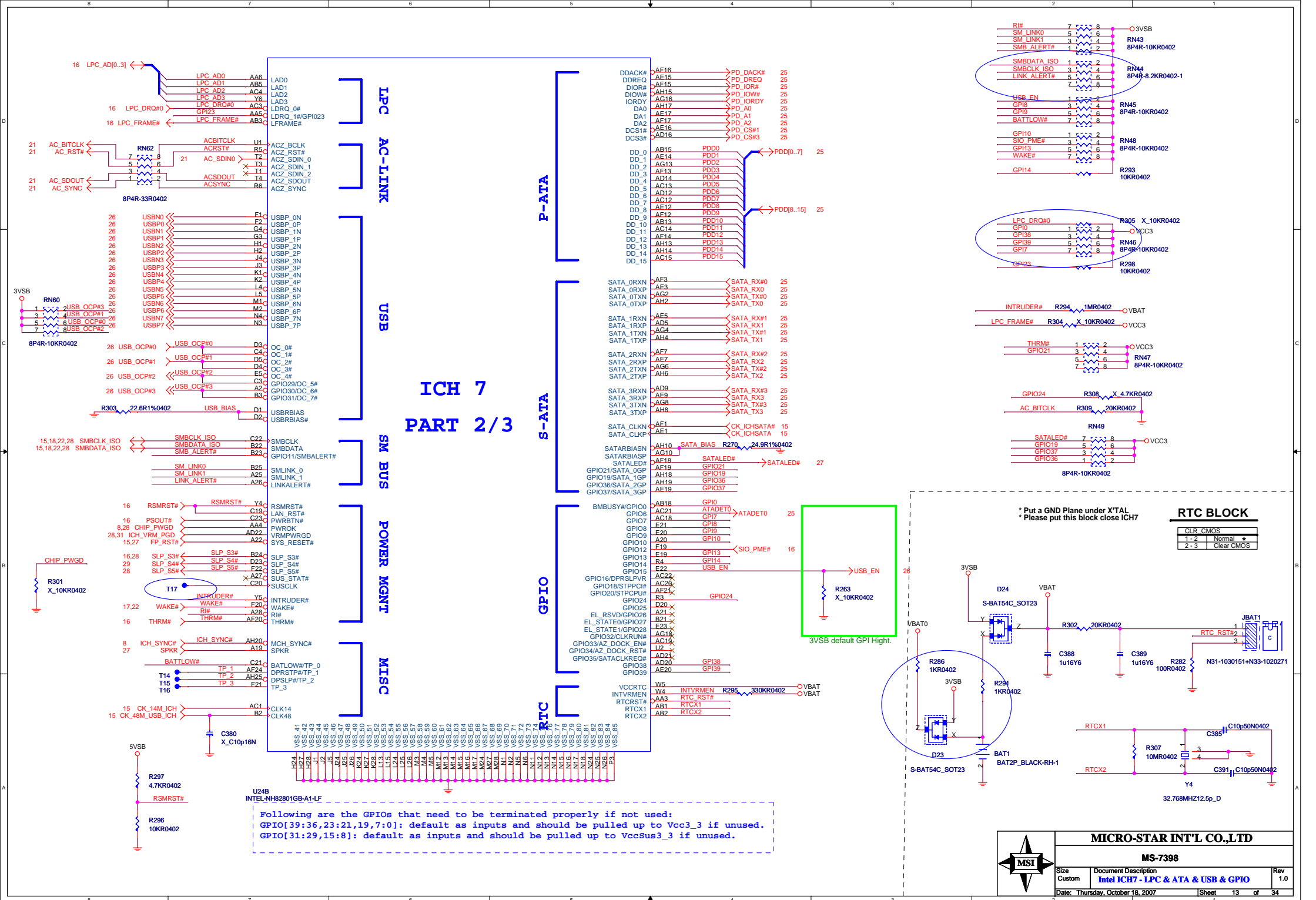
DIRECT MEDIA

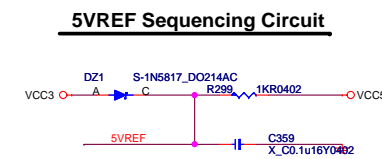
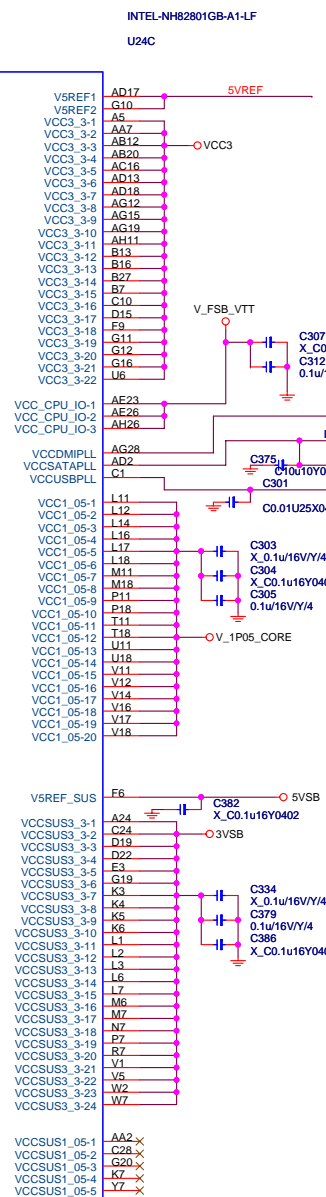
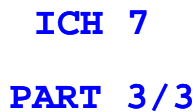
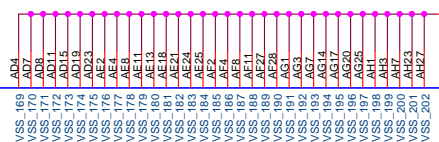
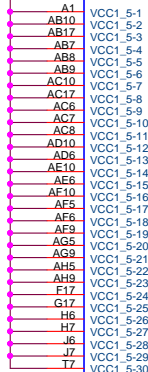
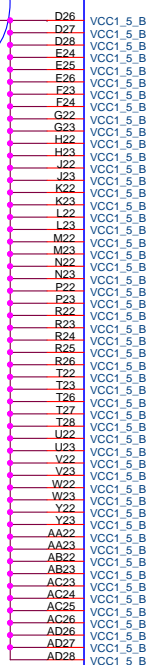
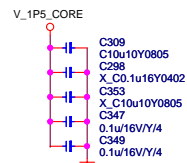
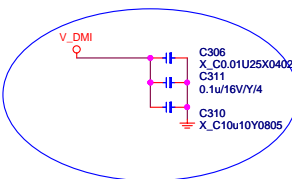
LAN

INTERUPT SPI

GNT5#	GNT4#	ROUTING
0	1	Flash Cycles Routed to SPI
1	0	Flash Cycles Routed to PCI
1	1	Flash Cycles Routed to LPC

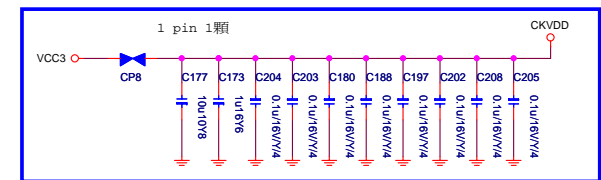
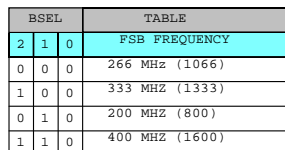






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<b>MS-7398</b>			
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The timing diagram shows two signals, CLK\_X1 and CLK\_X2, over a time period from 0 to 100 ns. CLK\_X1 is a red signal that transitions from low to high at approximately 10 ns and remains high until 100 ns. CLK\_X2 is a blue signal that transitions from low to high at approximately 20 ns and remains high until 100 ns. The signals are labeled as 14.318MHZ16P\_D and Y1. The signals are connected to pins 1 and 2 of a component, with capacitors C165 and C166 (30p50N) connected to ground. The signals are also connected to a component labeled Y1.



The diagrams show three different circuit configurations for selection lines:

- SEL 0:** A red line labeled "SEL 0" is connected to a blue zigzag resistor labeled "R158" with a value of "10KR0402". The other end of the resistor is connected to a red line labeled "CKVDD".
- SEL 1:** A red line labeled "SEL 1" is connected to a blue zigzag resistor labeled "R186" with a value of "10KR0402". The other end of the resistor is connected to a red line labeled "GND".
- SEL P4/K8#:** A red line labeled "SEL P4/K8#" is connected to a blue zigzag resistor labeled "R159" with a value of "X 10K/4". The other end of the resistor is connected to a red line labeled "CKVDD".

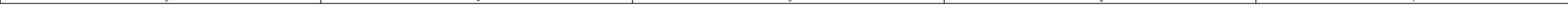
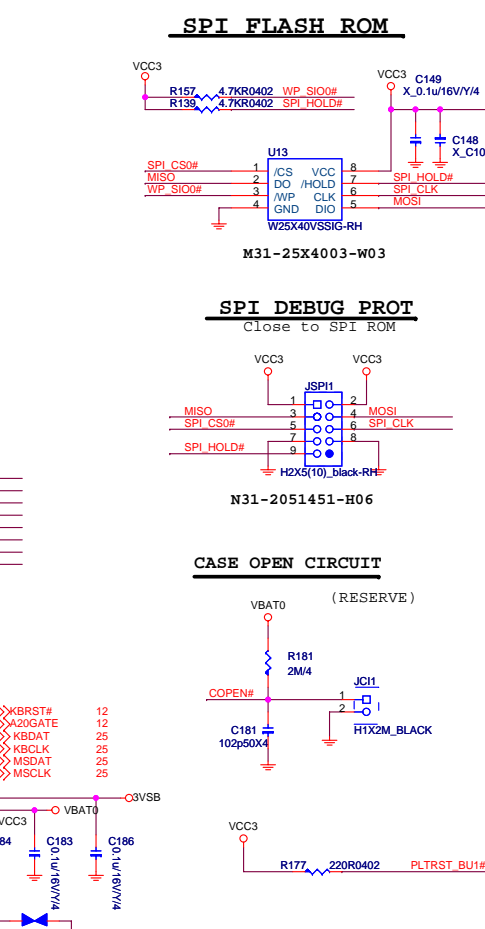
SEL_1	SEL_0	Chipset Support
0	0	SIS
1	0	VIA
0	1	Intel with graphic
1	1	Intel without graphic
SEL_P4/R#	PIN#40,41,43,44	
0	K8_3.3V swing	
1	P4_0.8V swing	
MODE	PIN#35/36	
0	PCIR-8 T/C	
1	PCI_STOP#/CPU_STOP#	
SEL24_48#	Pin#10	
0	48Mhz	
1	24Mhz	



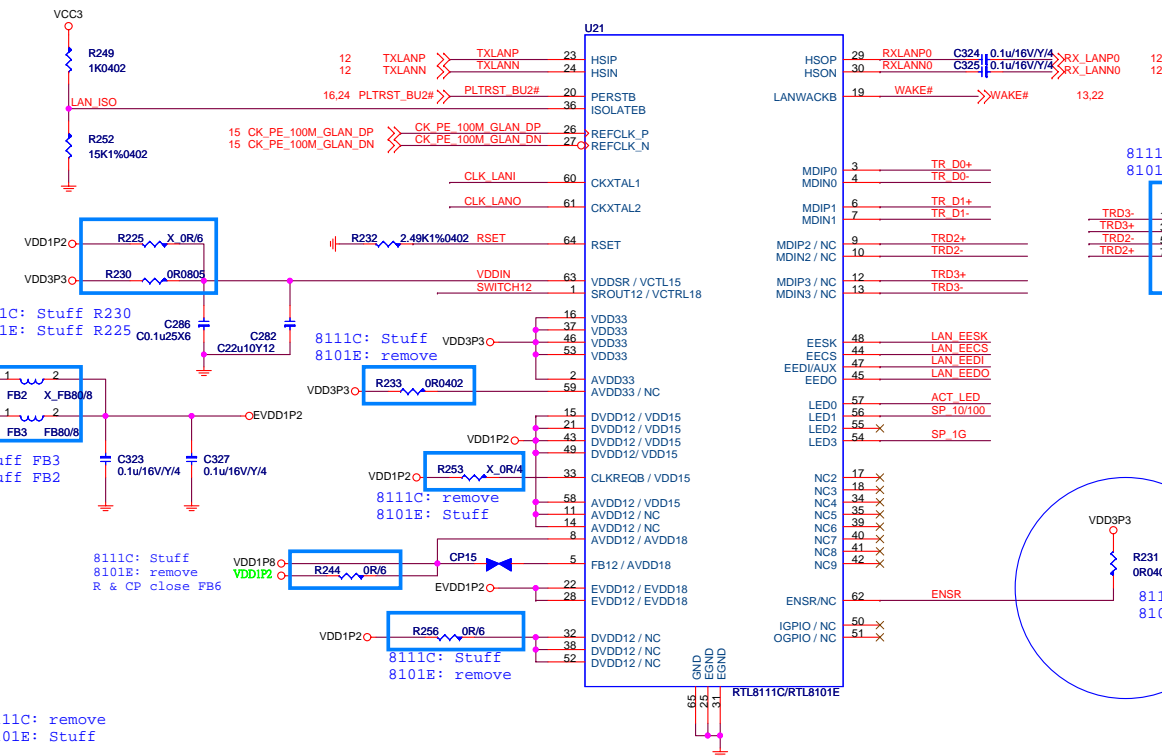
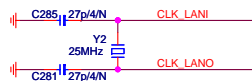
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Size Custom	Document Description <b>CLK-RTM 876-665</b>	Rev 1.0
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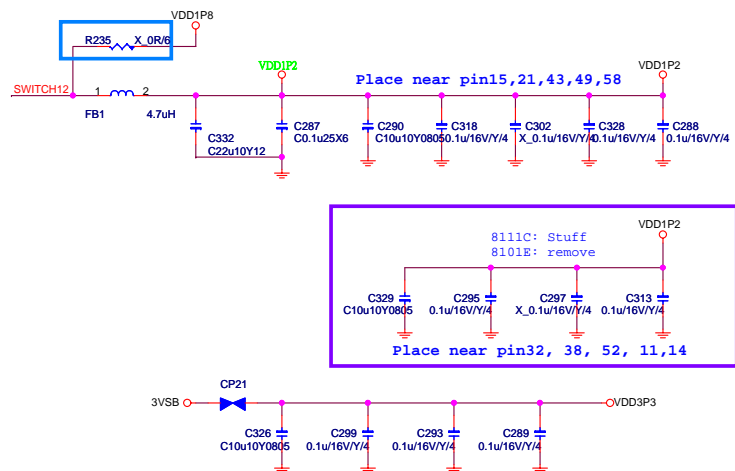






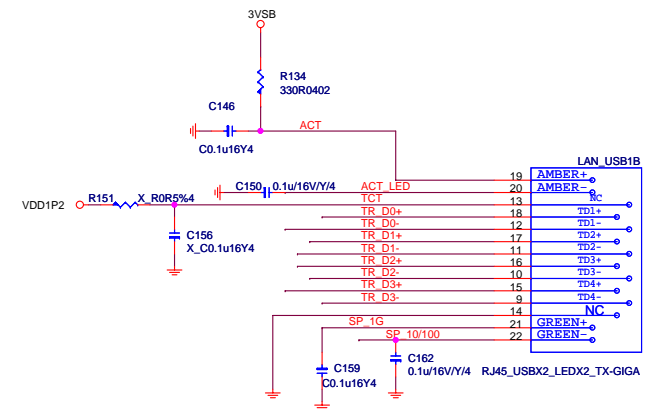
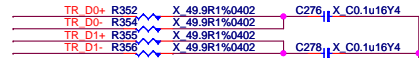


8111C: remove  
8101E: Stuff

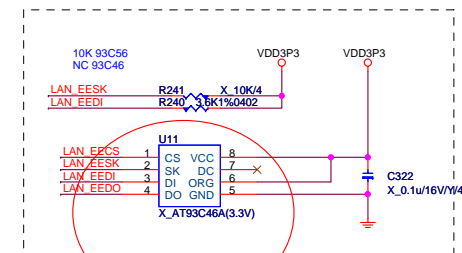


Place near pin32, 38, 52, 11,14

FOR 8101E



N58-22F0181-S42



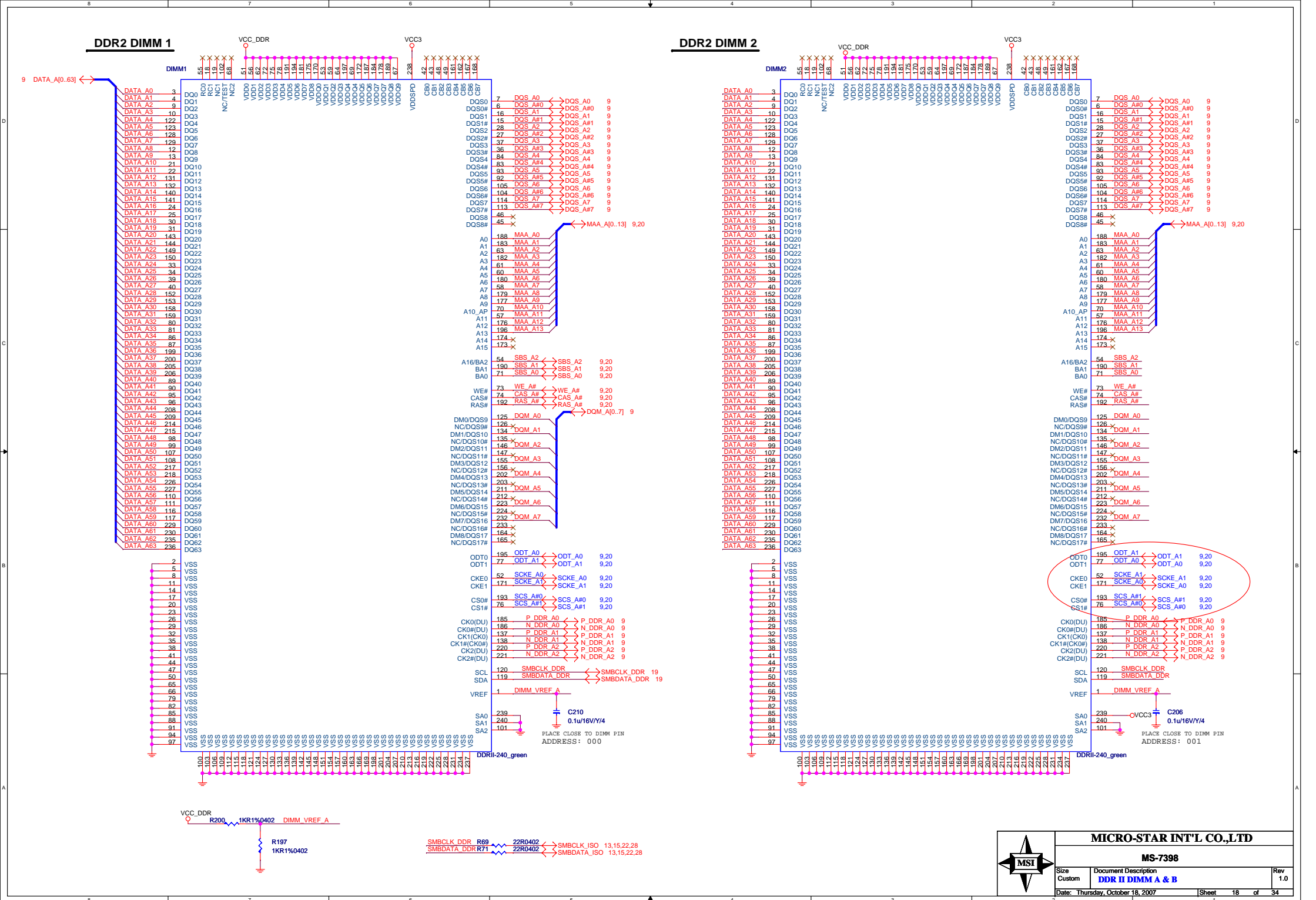
8101E(10/100 LAN)要上



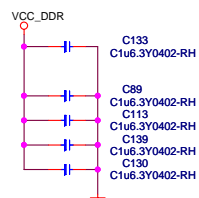
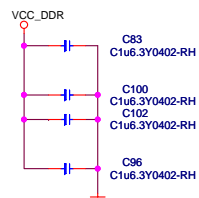
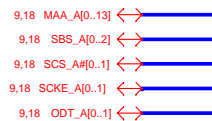
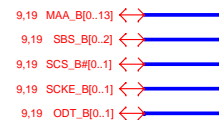
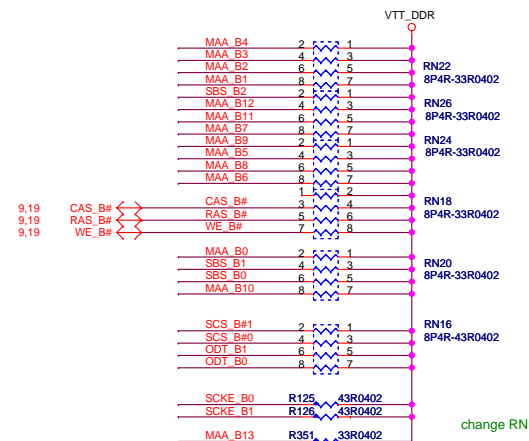
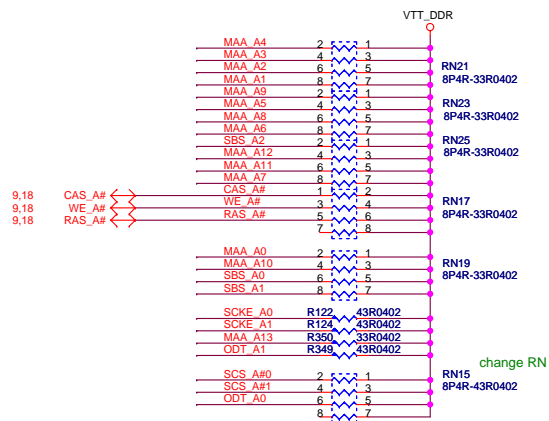
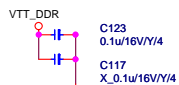
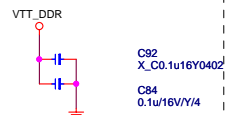
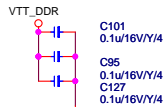
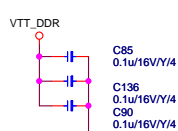
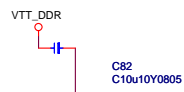
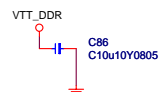
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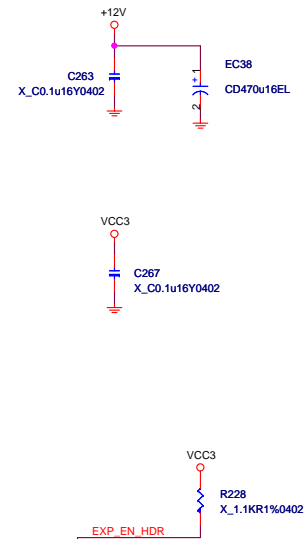
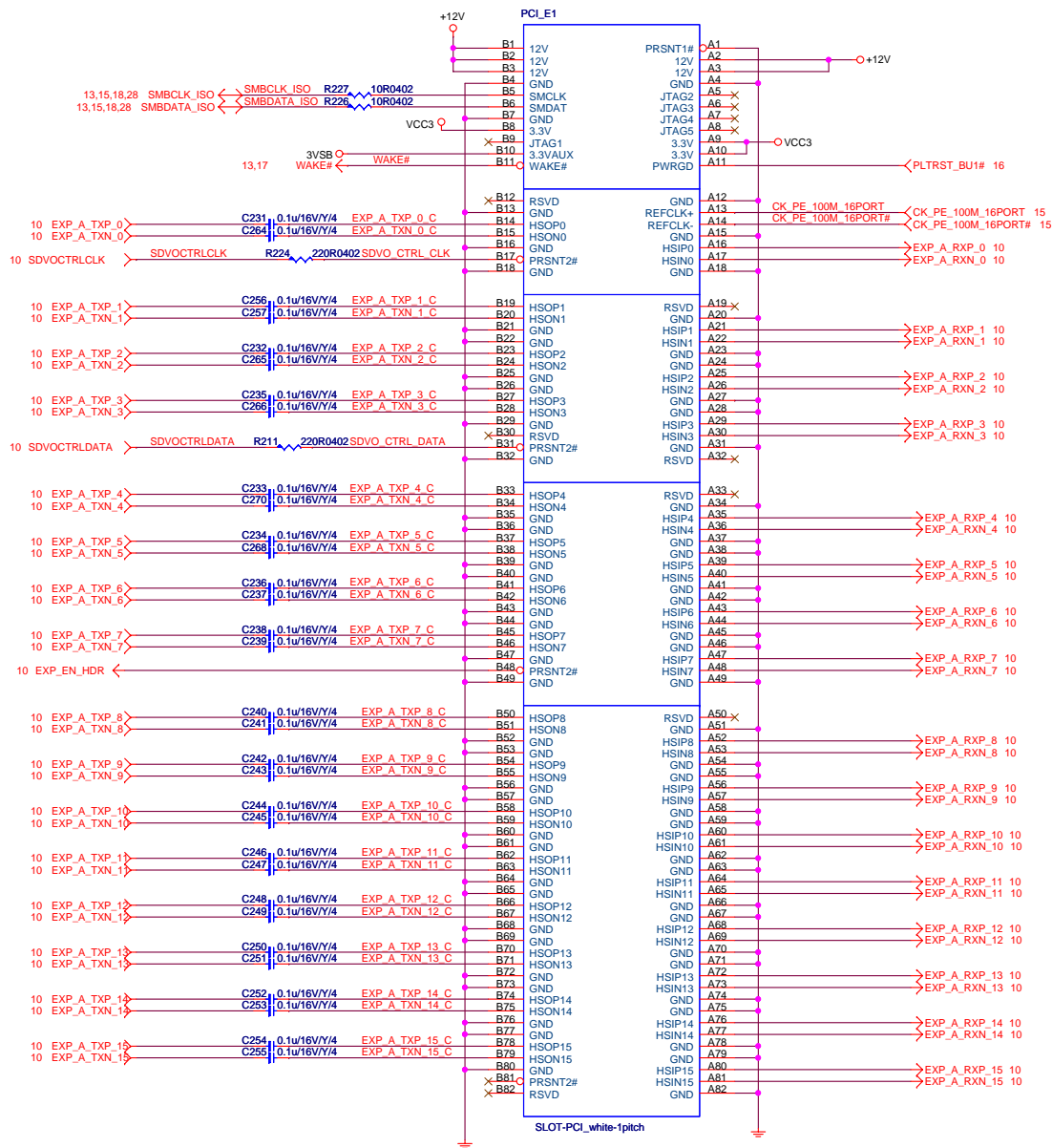
Size	Document Description	Rev
Custom	LAN Realtek RTL8111/RTL8101E	1.0
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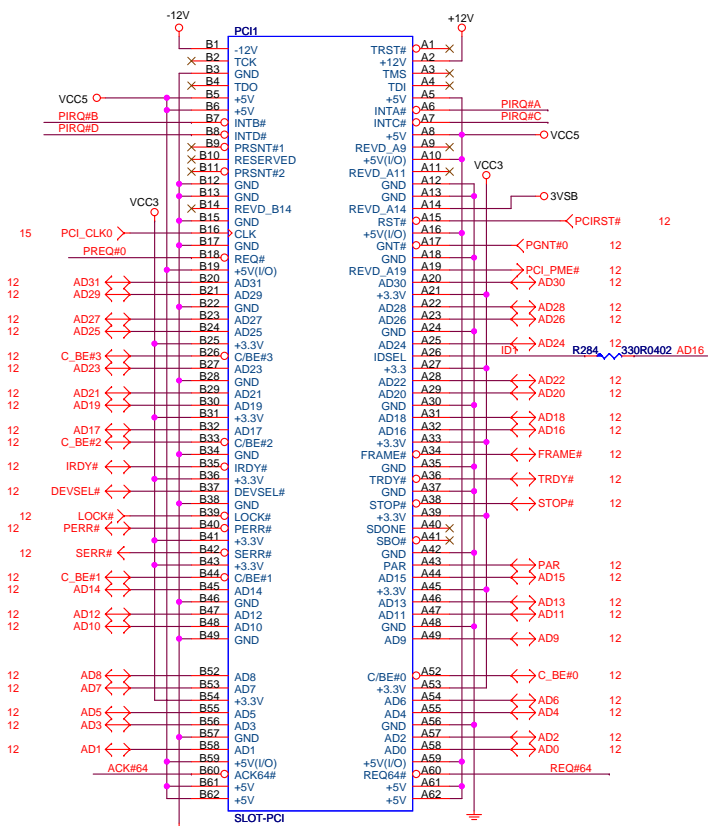






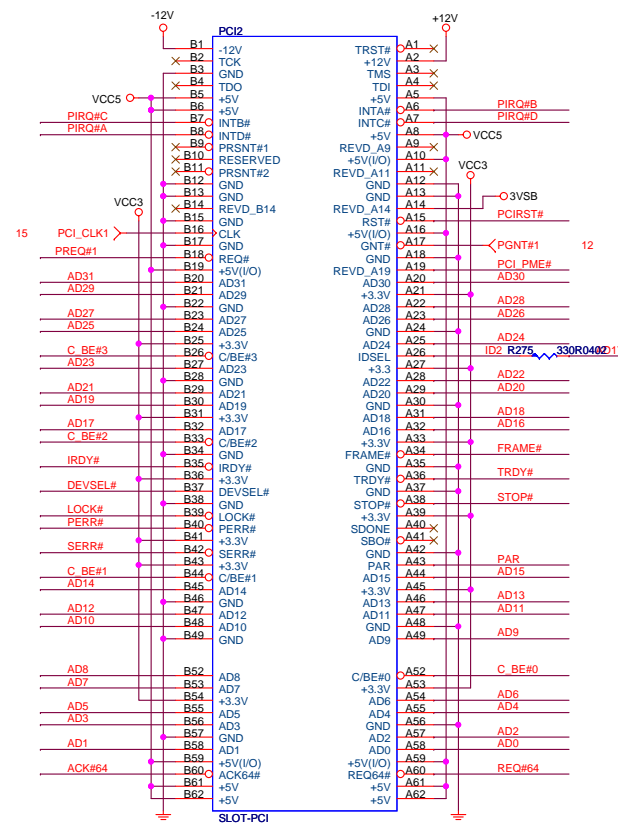


# **PCI SLOT 1 (PCI VER: 2.2 COMPLY)**



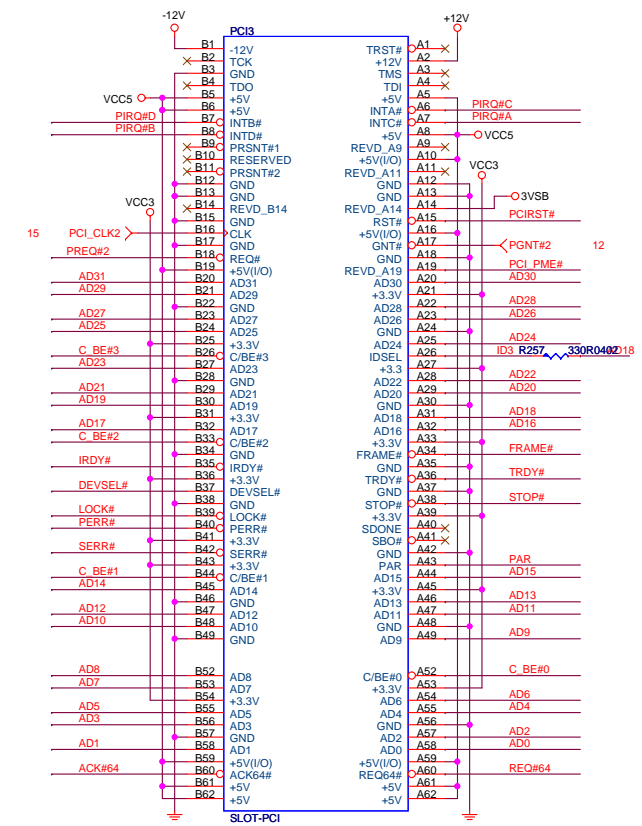
**IDSEL = AD16**  
**MASTER = PREQ#0**  
**PIRQ#A**

# **PCI SLOT 2 (PCI VER: 2.2 COMPLY)**



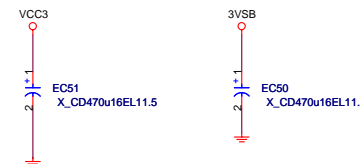
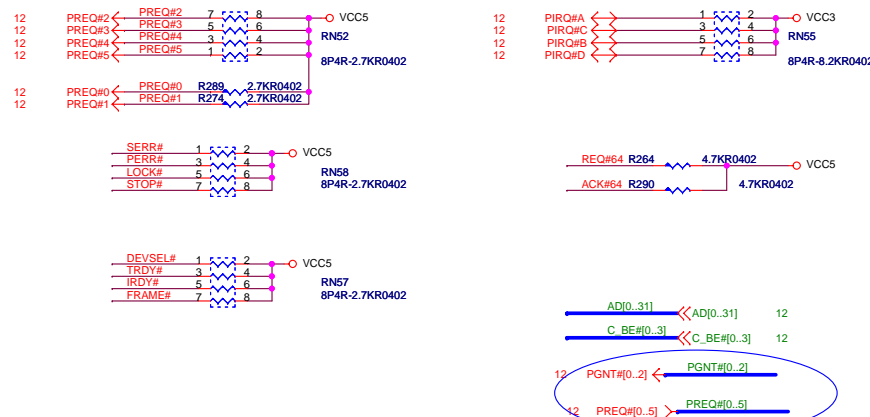
**IDSEL = AD17**  
**MASTER = PREQ#1**  
**PIRQ#B**

# **PCI SLOT 2 (PCI VER: 2.2 COMPLY)**

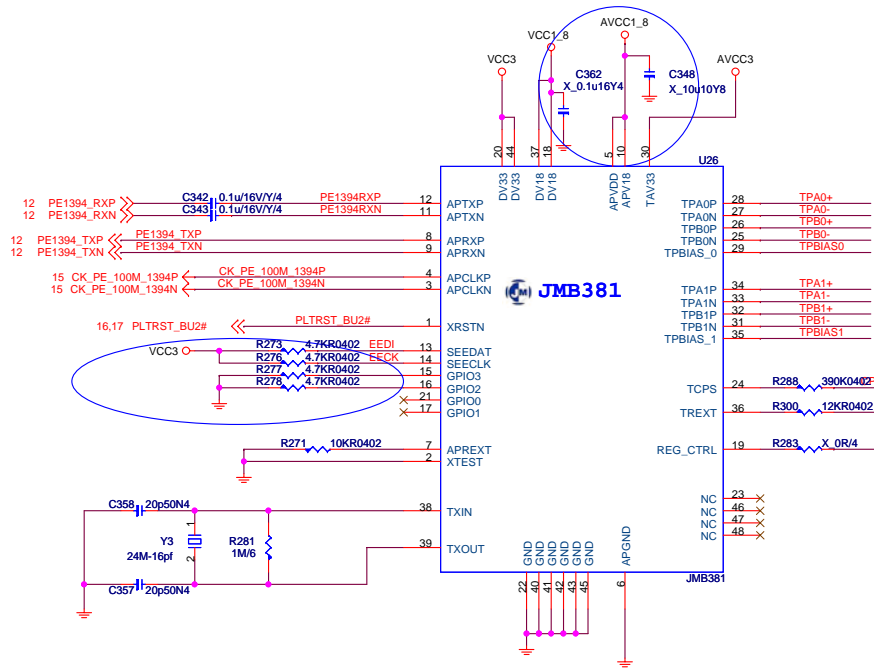


**IDSEL = AD18**  
**MASTER = PREQ#2**  
**PIRQ#C**

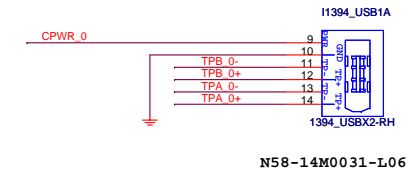
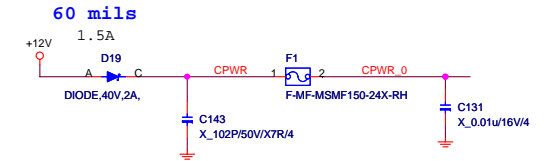
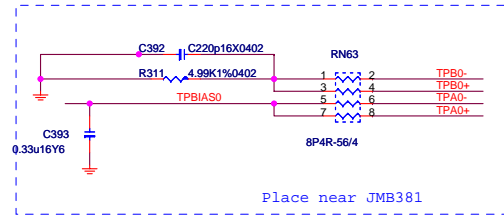
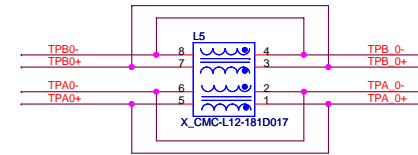
## **PCI PULL-UP / DOWN RESISTORS**



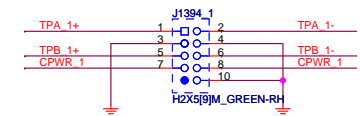
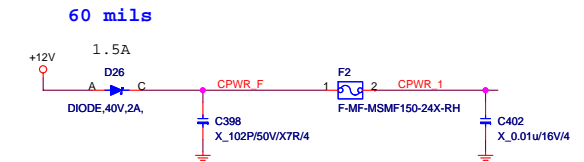
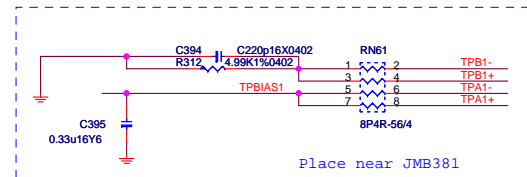
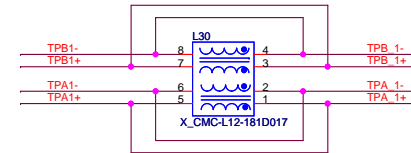




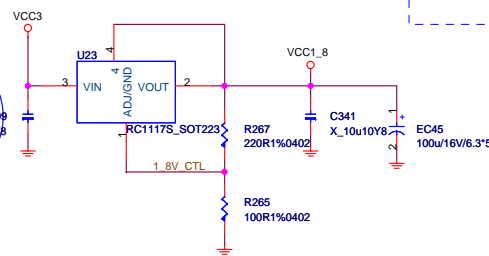
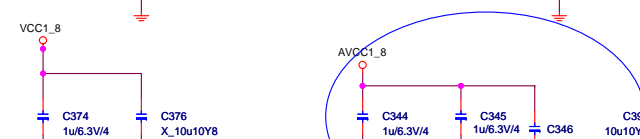
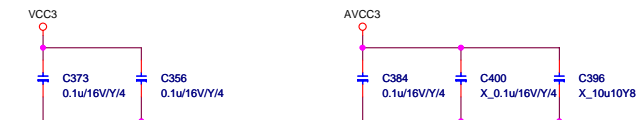
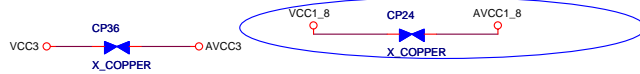
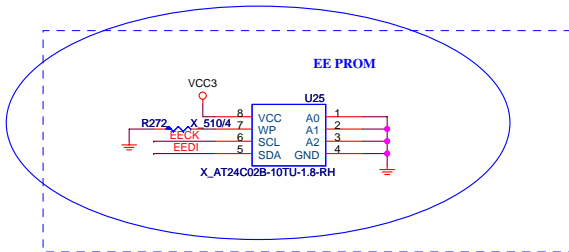
#### Rear 1394 port



#### Front 1394 pin header

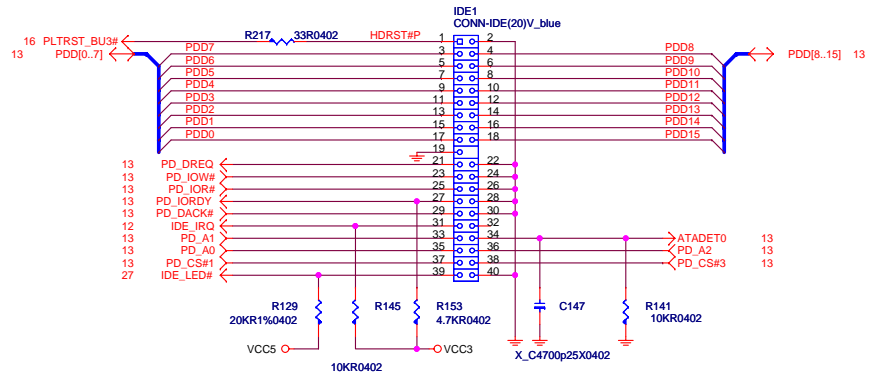


For Intel 1394 pinheader

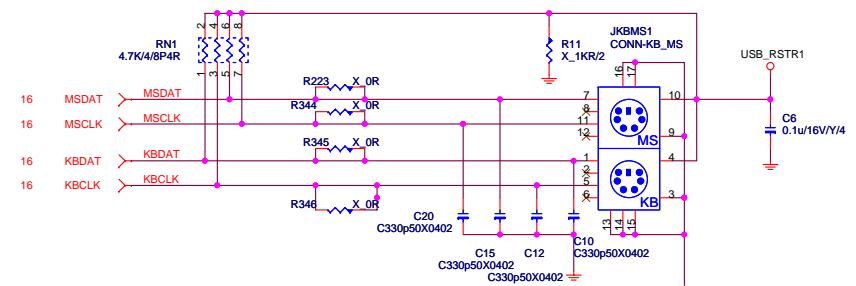




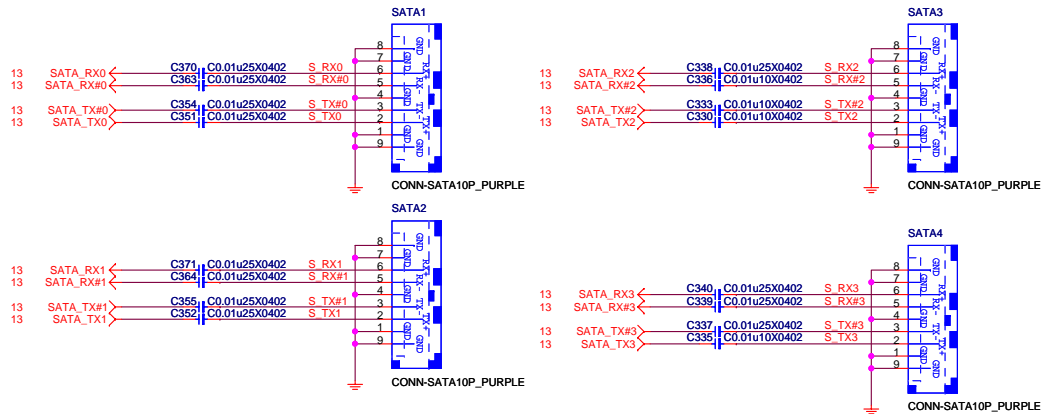
## ATA 33/66/100 IDE Connectors



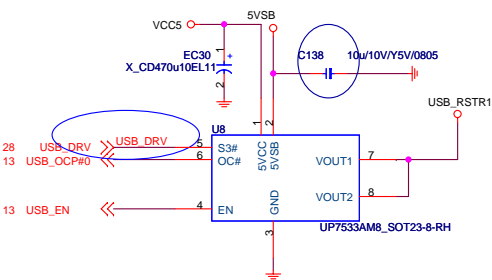
## PS2 KEYBOARD & MOUSE CONNECTOR



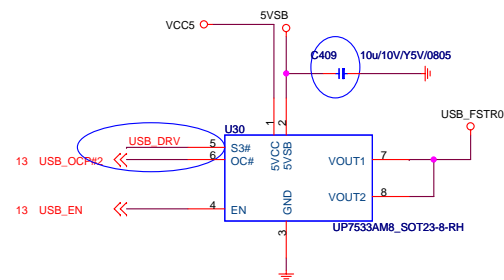
## SERIAL ATA CONNECTOR BLOCK



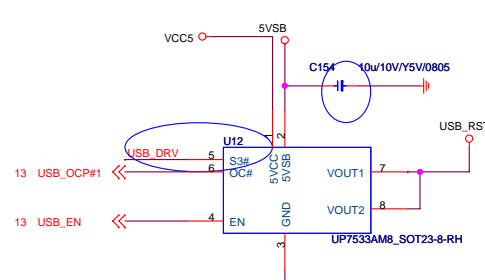
## POWER CIRCUIT FOR USB PORT 0,1



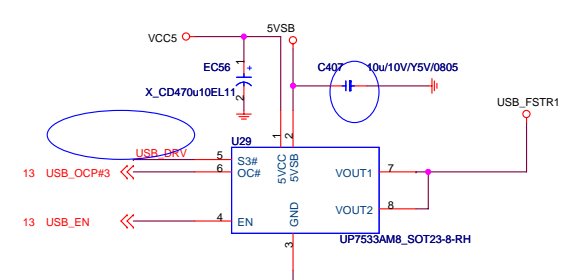
## POWER CIRCUIT FOR USB PORT 4,5



## POWER CIRCUIT FOR USB PORT 2,3

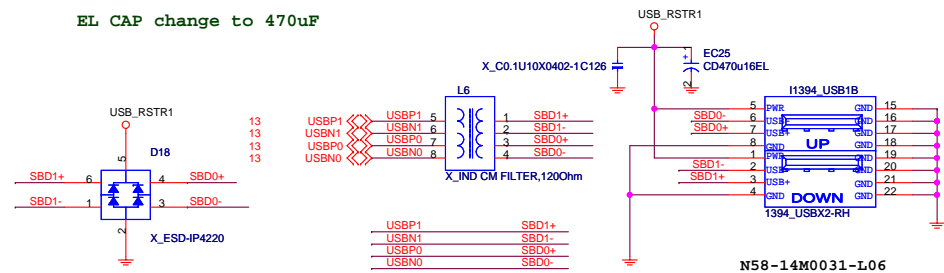


## POWER CIRCUIT FOR USB PORT 6,7



## REAR PANEL USB CONNECTOR FOR USB PORT 0,1

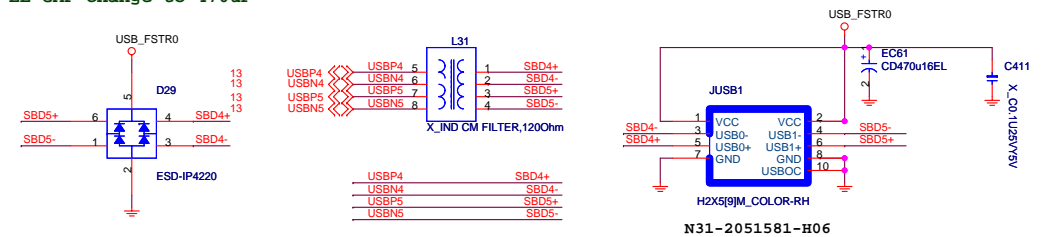
EL CAP change to 470uF



22 / 7.5 / 7.5 / 7.5 / 22 / 7.5 / 7.5 / 7.5 / 22

## FRONT PANEL USB CONNECTOR FOR USB PORT 4,5

EL CAP change to 470uF

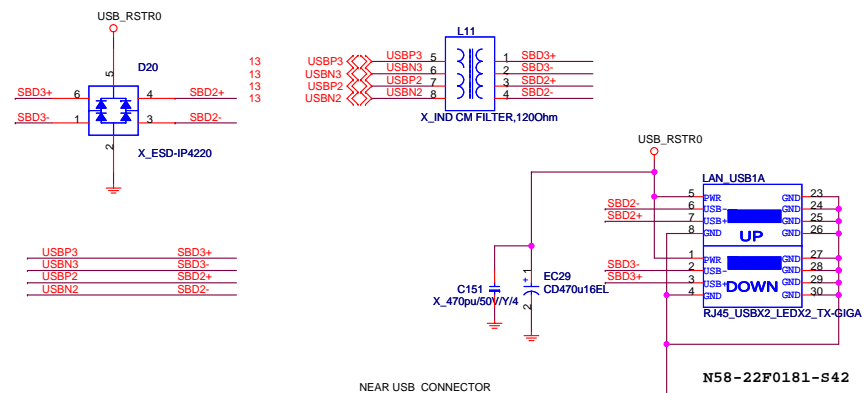


22 / 7.5 / 7.5 / 7.5 / 22 / 7.5 / 7.5 / 7.5 / 22

EL CAP change to 470uF

## REAR PANEL USB CONNECTOR FOR USB PORT 2,3

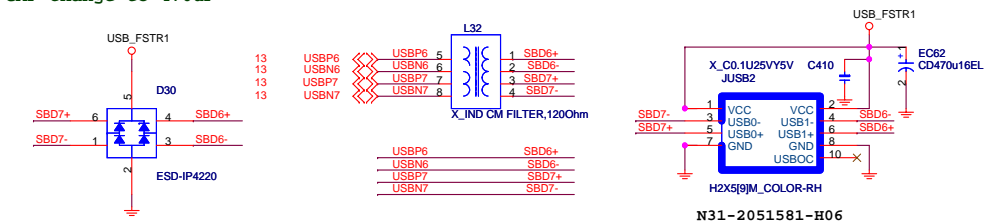
Stuff for channel and gateway



22 / 7.5 / 7.5 / 7.5 / 22 / 7.5 / 7.5 / 7.5 / 22

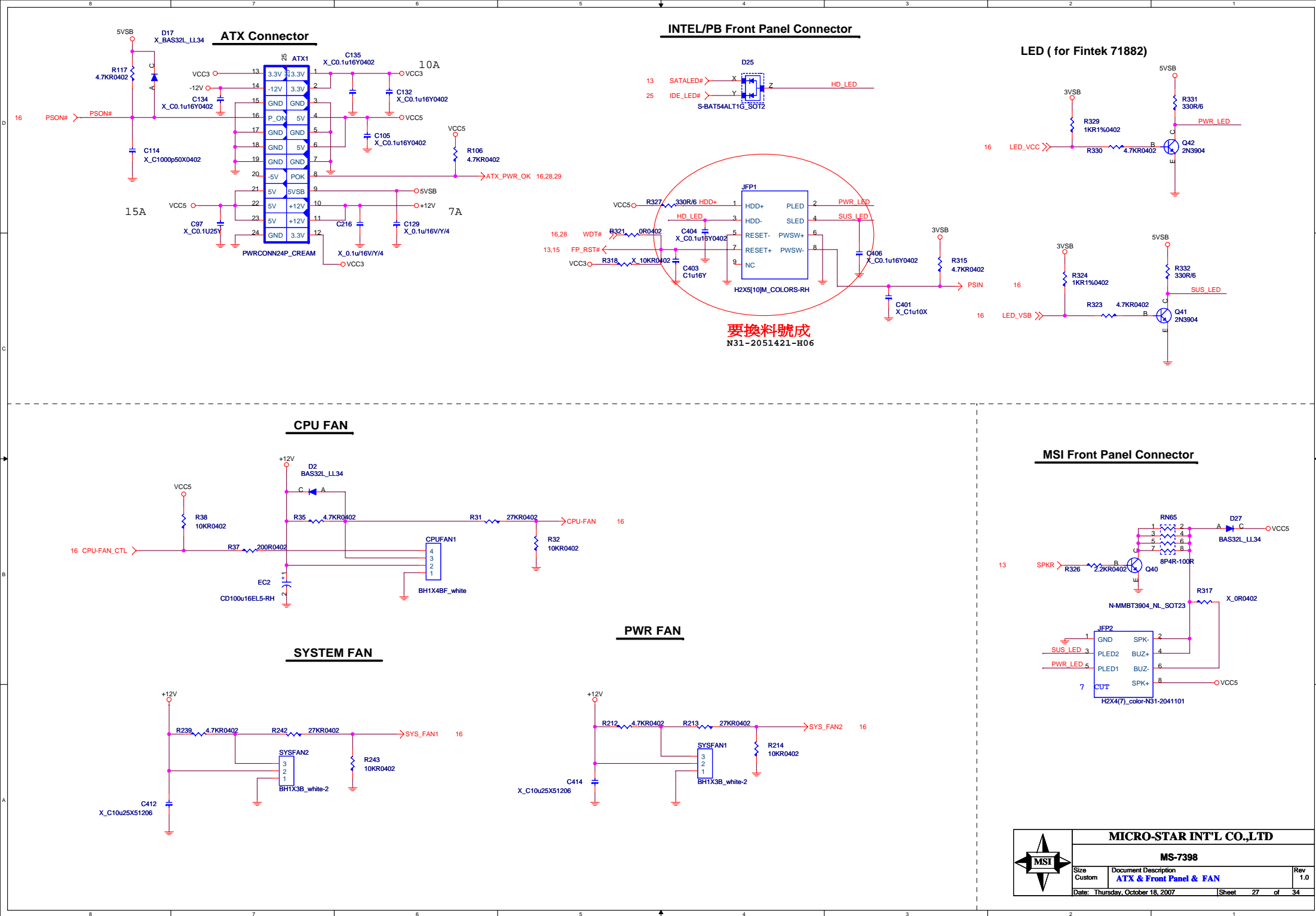
## FRONT PANEL USB CONNECTOR FOR USB PORT 6,7

EL CAP change to 470uF

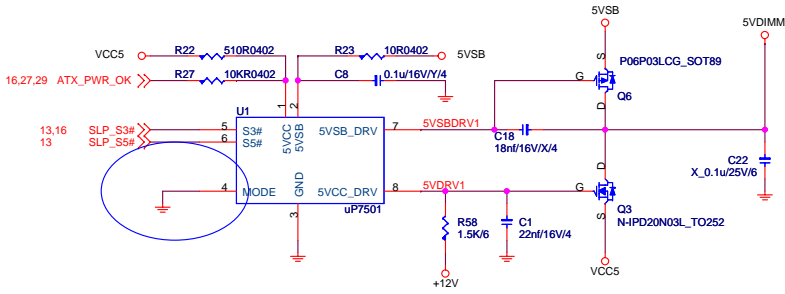


22 / 7.5 / 7.5 / 7.5 / 22 / 7.5 / 7.5 / 7.5 / 22

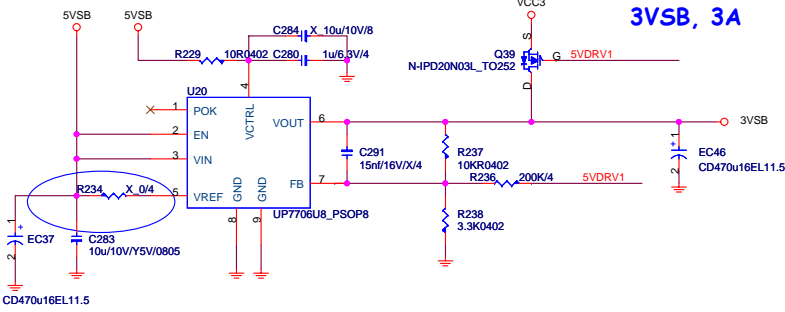
MICRO-STAR INT'L CO.,LTD			
MS-7398			
Size	Document Description		Rev
Custom	USB CONNECTORS		1.0
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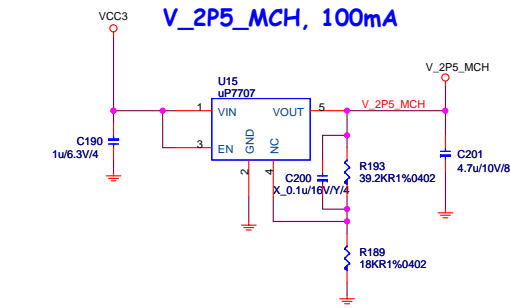
## 5VDIMM FOR DDR



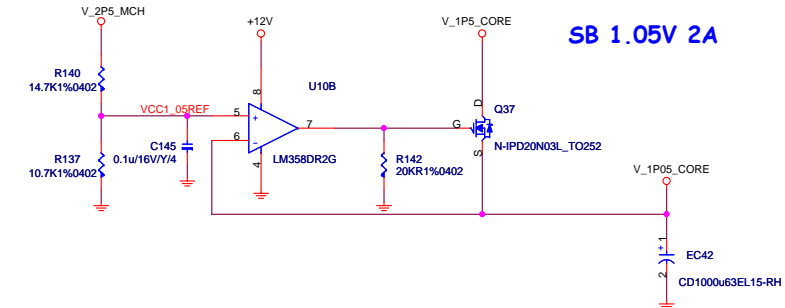
## 3VSB, 3A



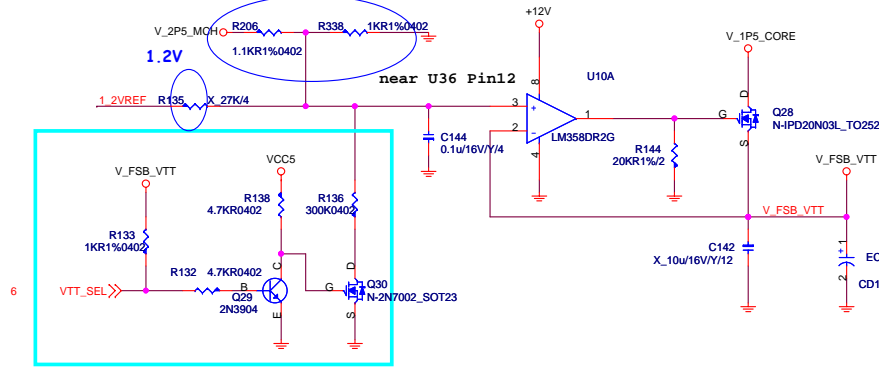
## V\_2P5\_MCH, 100mA



## SB 1.05V 2A



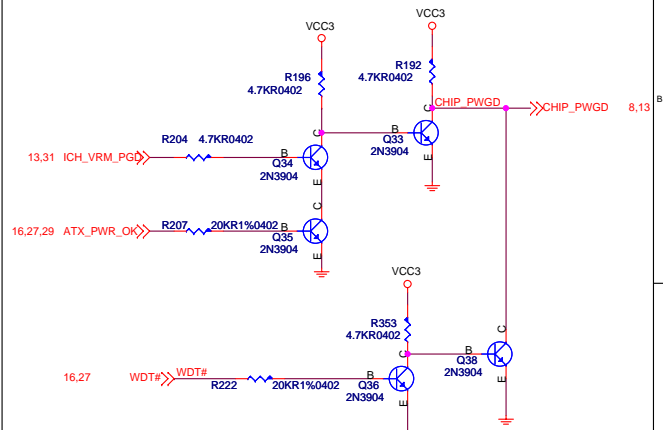
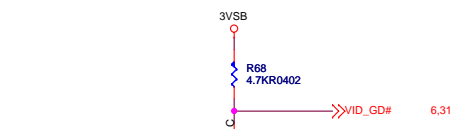
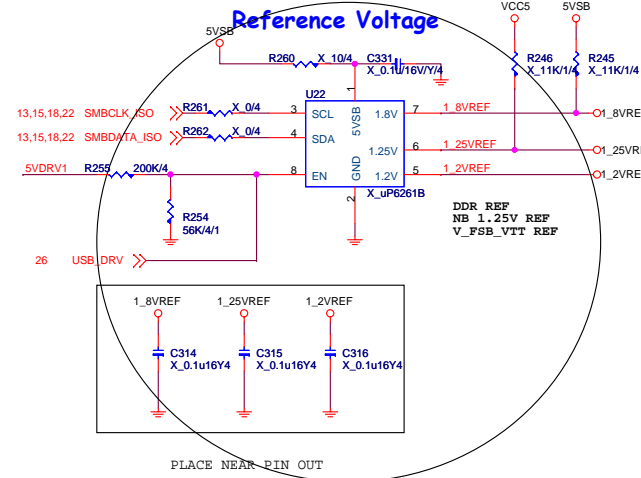
## 1.2V



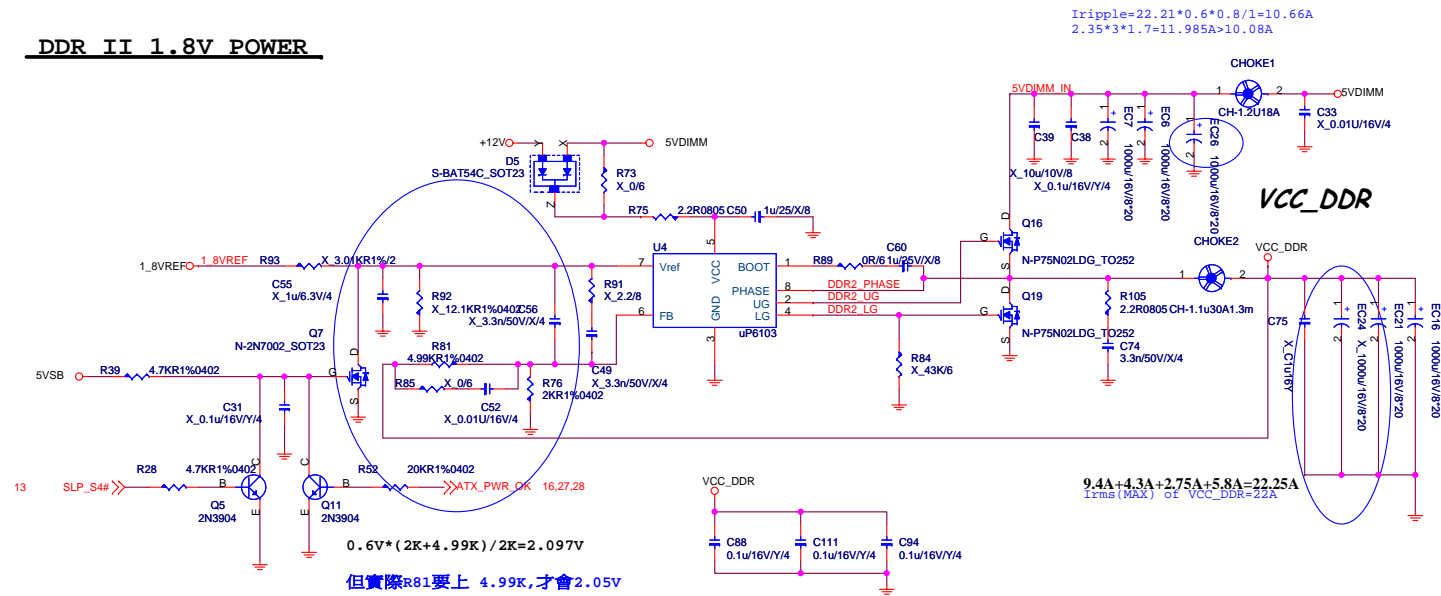
## FSB\_VTT, 6.2A 3.66W

VTT_SEL = L	V_FSB_VTT=1.1V	For future KENTSFIELD processor. (FSB1333, Quad-Core)
VTT_SEL = H	V_FSB_VTT=1.2V	For normal processors.

## Reference Voltage

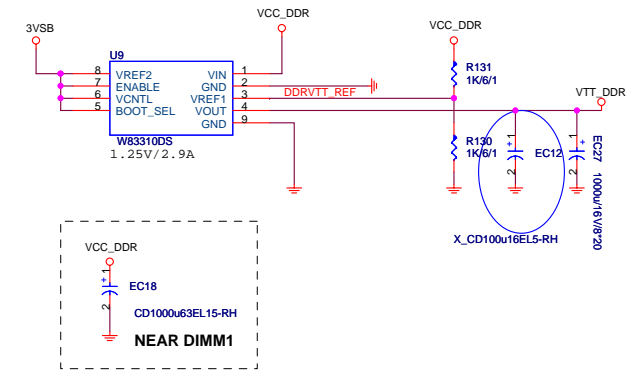


## DDR II 1.8V POWER

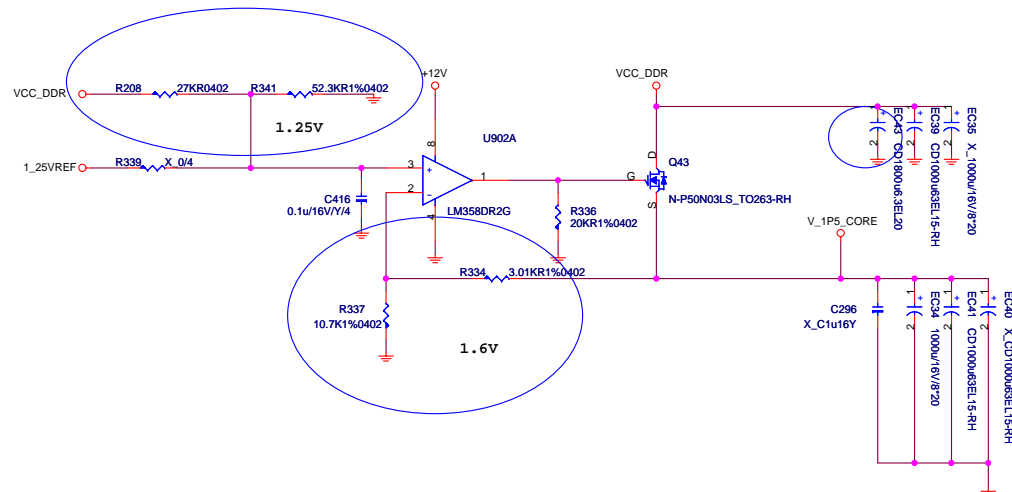


To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .

### DDR VTT Power

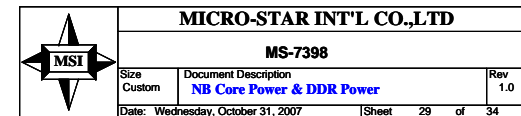


NB 1.5V POWER

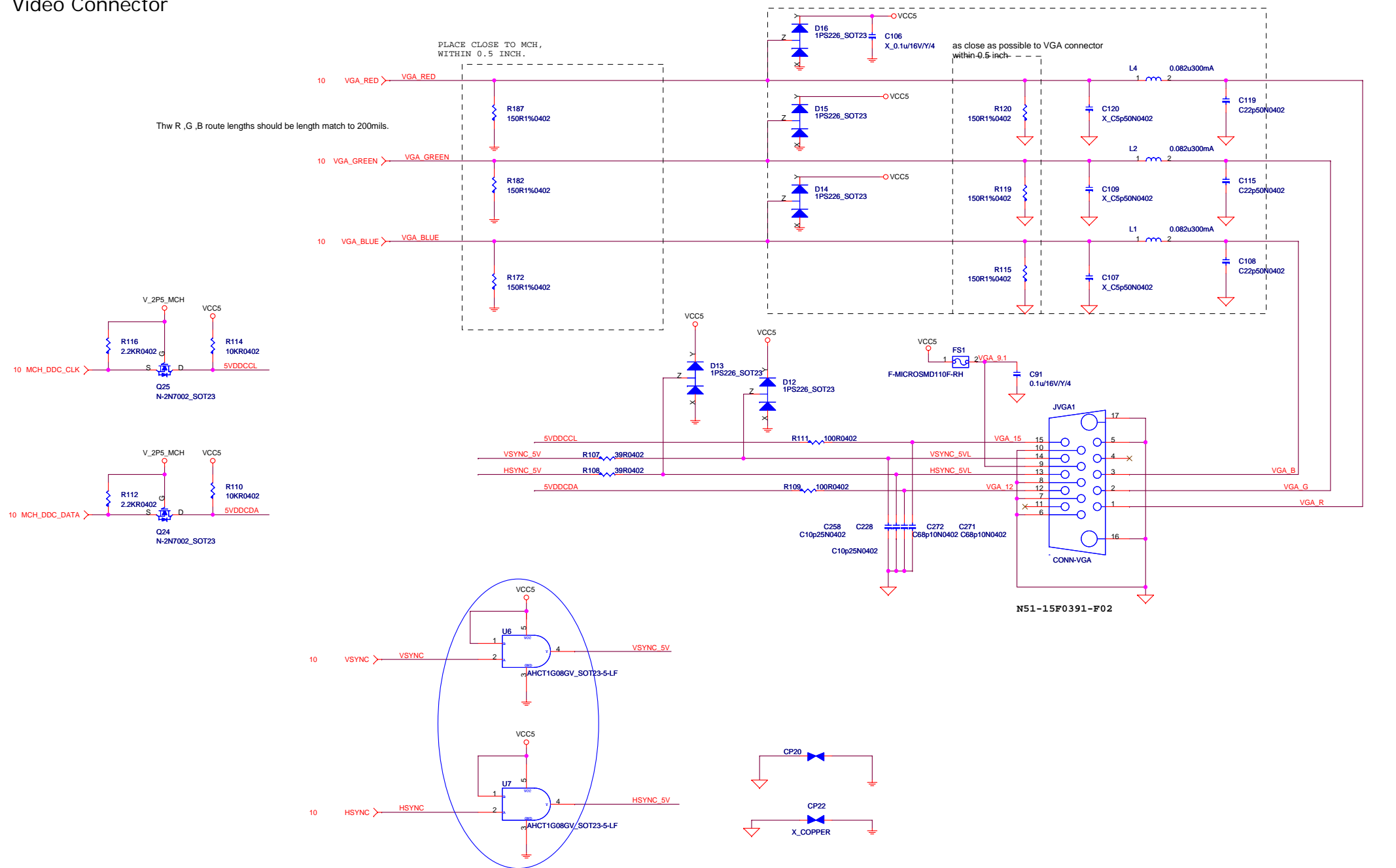

$$\begin{aligned} \text{Iripple} &= 16.3 \times 0.49 \times 0.878 / 1 = 7\text{A} \\ 1.14 \times 3 \times 1.7 &= 5.814\text{A} > 5.59\text{A} \end{aligned}$$

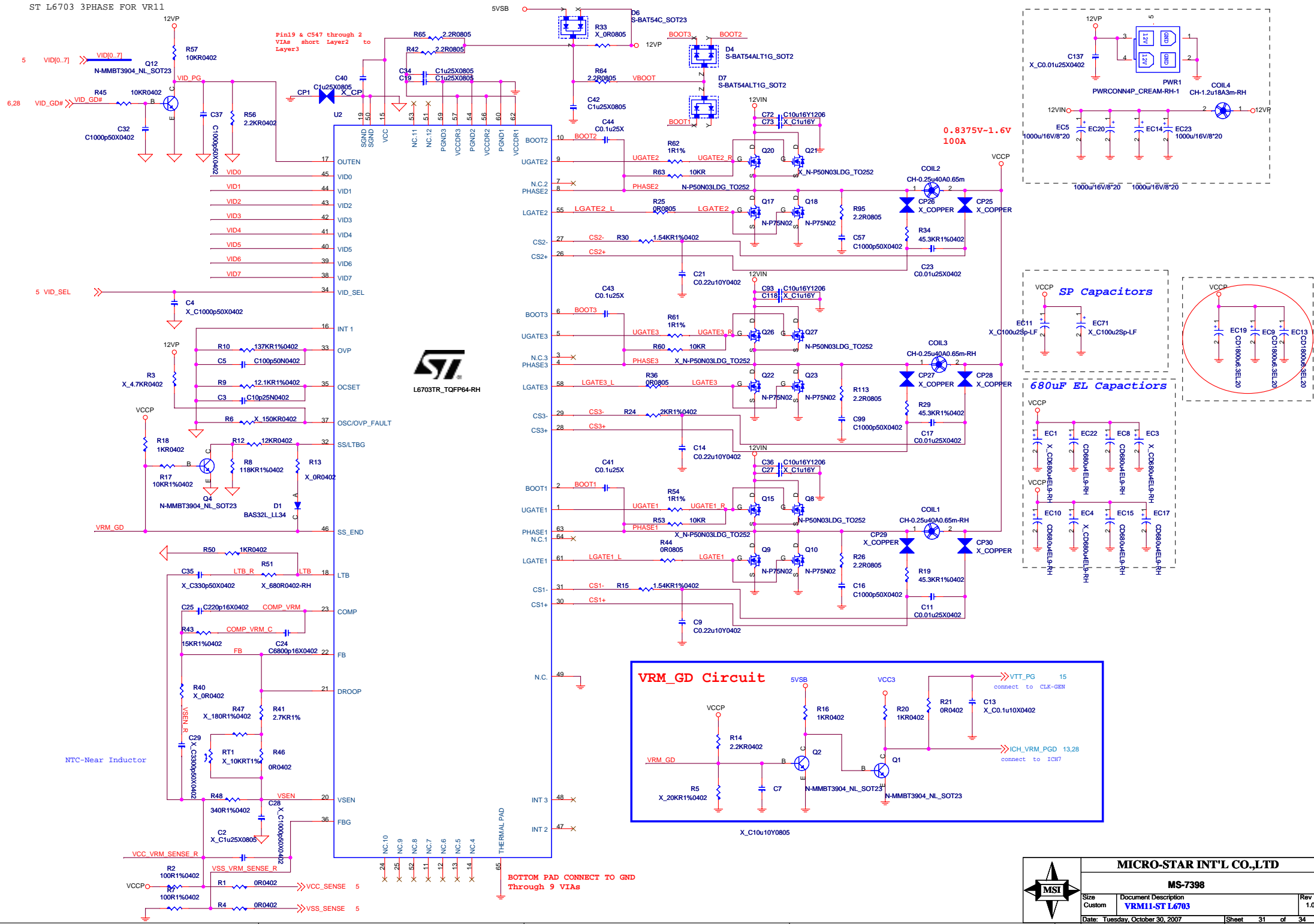
***NB\_V1.5***

Irms(MAX) of V\_1P5\_CORE

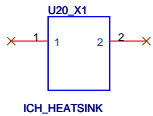
$$13.8\text{A} + 6.2\text{A} = 20\text{A}$$


Video Connector

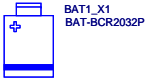
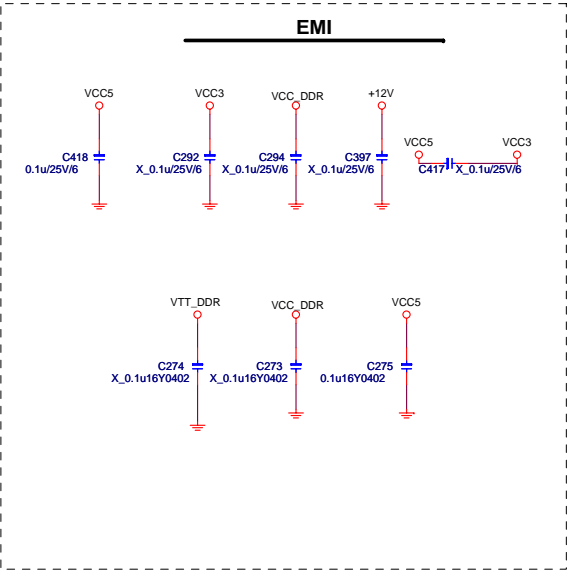
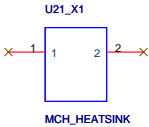




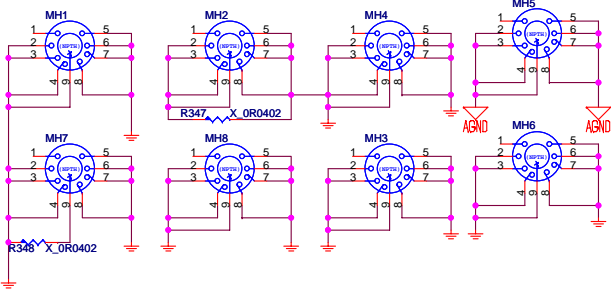
ICH7 HEATSINK



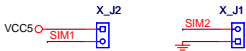
MCH HEATSINK



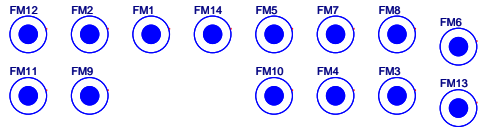
Mounting Holes



Simulation



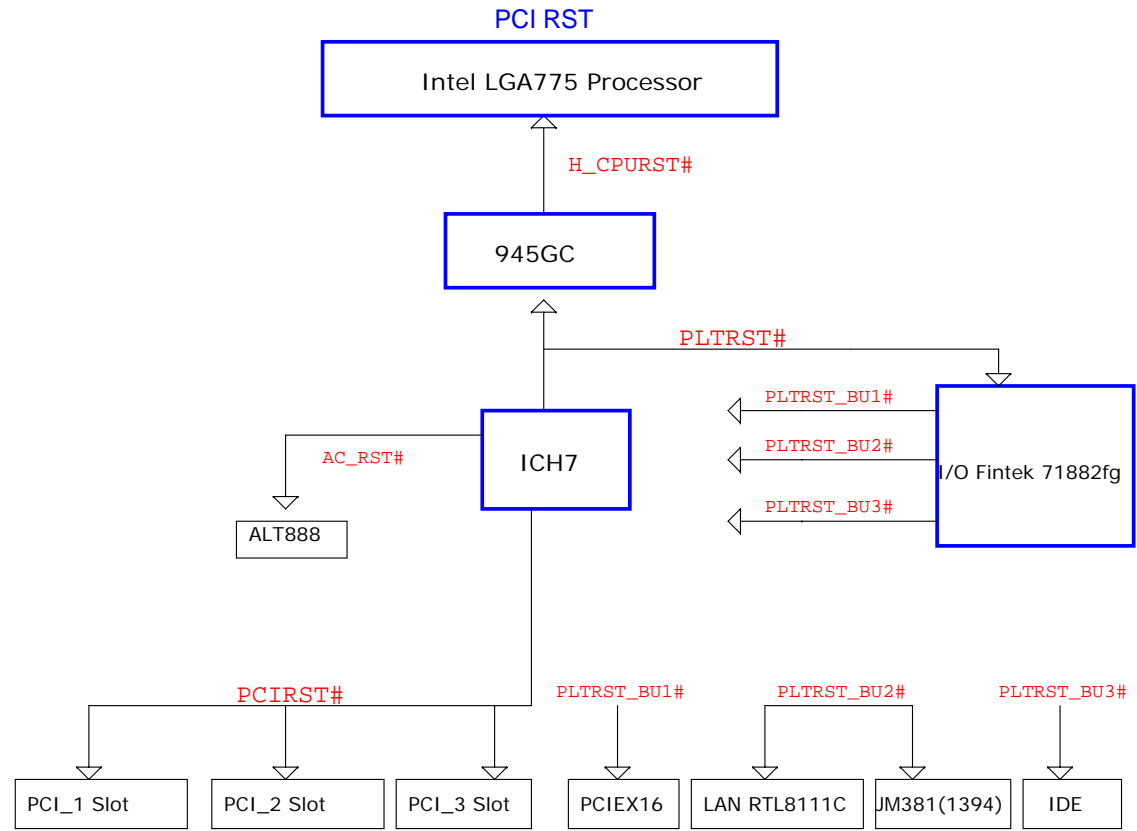
Optics Orientation Holes



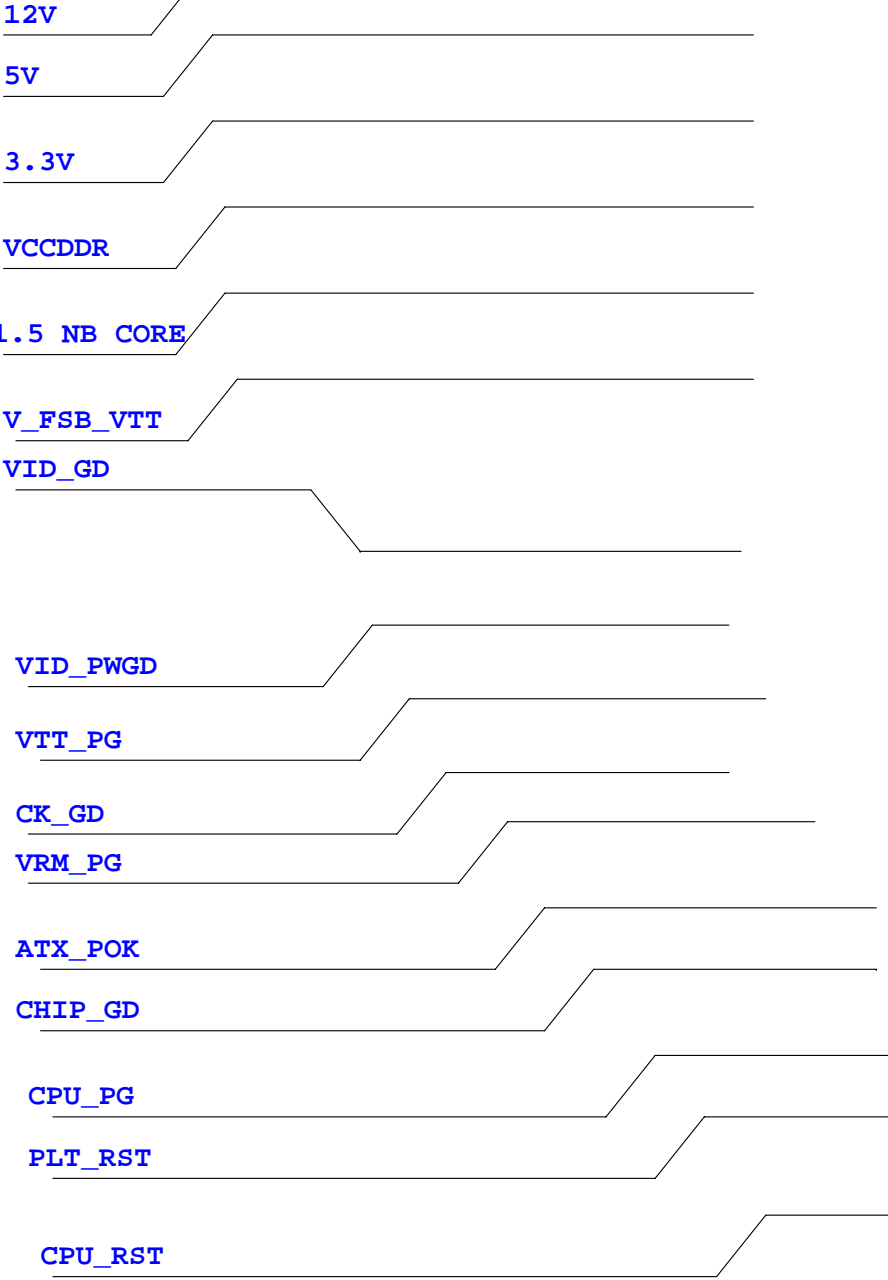
Opt-part	
Opt-part	
	AUDIO 3孔
JACK-AUDIOX3F_PK/GR/BU-RH-2	
	LAN 8101E
REALTEK/RTL8101E	
	LAN 8101E 10/100 CONNECT
R/GR+L/YL/10/100	

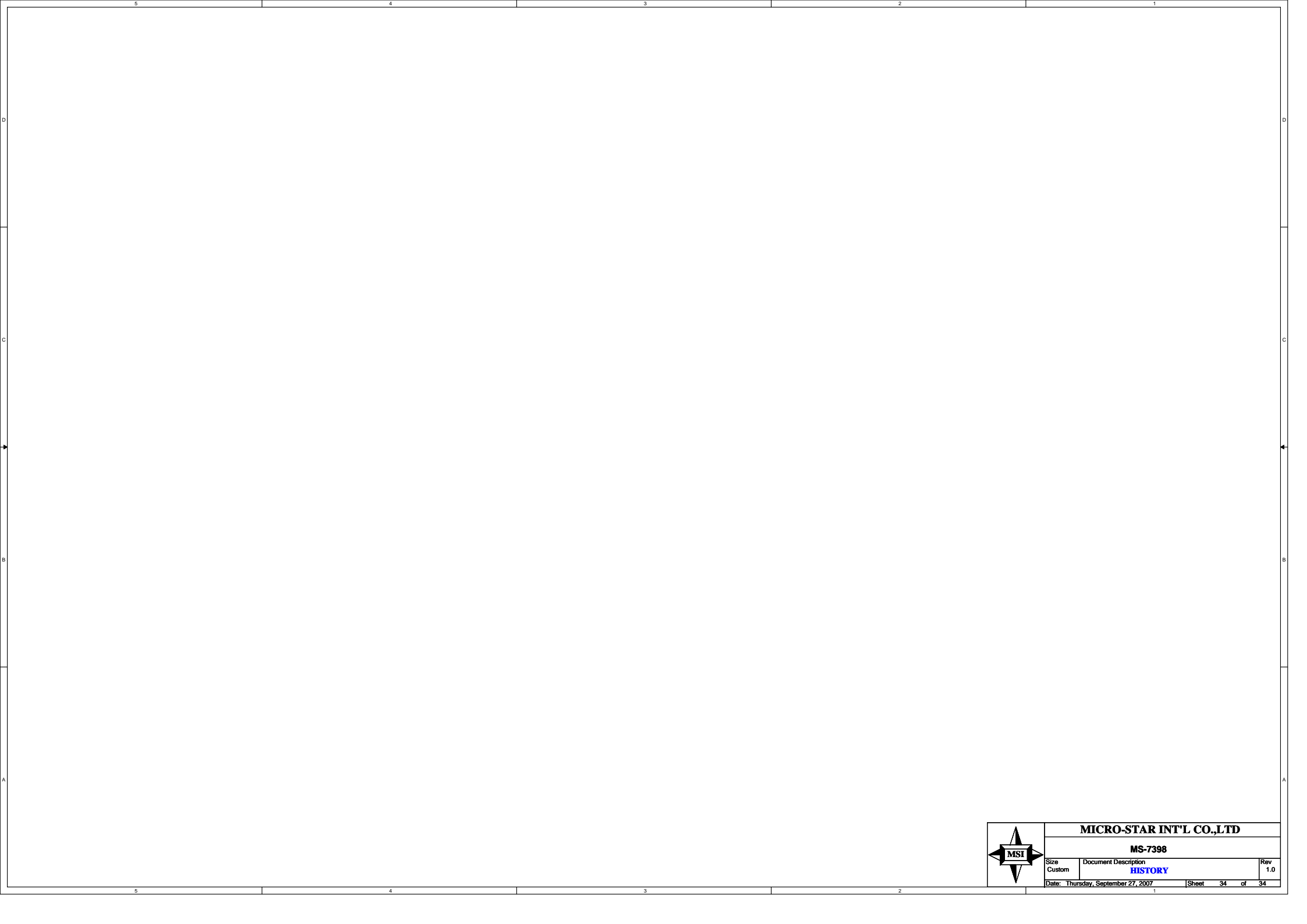



POWER	Function	CURRENT(A)	IC
3VSB	For All System	3	7706
5VSB	For VDDR SOURCE	3	7501
VCCP	FOR CPU CORE	100	6322
VCC_DDR	FOR DDR & NB_CORE	14	6103
V_1P5_CORE	FOR NB CORE POWER	17	OP+MOS
DDR_VTT	FOR DDR TERMINATOR	1.2	W83310
V_FSB_VTT	FOR CPU BUS	6	OP+MOS
V_2P5_MCH	FOR NB VGA DAC	100m	7707
V_1P05_CORE	FOR SB CORE POWER	1.3	OP+MOS
USB_RSTR0~1&USB_FSTR0~1	FOR USB POWER	1 port 500m	7533
VOLTAGE ADJ	OVER VOLTAGE		6261



POWER ON SEQUENCE







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MS-7398		
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